

SEQUENCE LISTING

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Possani Postay, Lourival Domingos

<120> Recombinant Immunogens for the Generation of Antivenoms to the
Venom of Scorpions of the Genus Centruroides

<130> 2099.0070001

<150> US 60/430,067
<151> 2002-12-02

<160> 294

<170> PatentIn version 3.1

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<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

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<223> Product= Sodium-channel modifier toxin

<220>
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Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly
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aca gtg tgg gca aag gaa ggt tat ctg gta agc aag agc acg ggc tgc 96
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys

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aaa tac gag tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa					144
Lys Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu	15		20	25	
tgc aaa gcg ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc					192
Cys Lys Ala Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe	30		35	40	
gca tgc tgg tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att					240
Ala Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile	45		50	55	60
cct ggt aat gaa aac gac ttt tta ttgtccacca acagaaatat tgtaacgctt					294
Pro Gly Asn Glu Asn Asp Phe Leu	65				
cttaa					299
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Val Trp Ala Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys					
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Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys					
15		20		25	
Lys Ala Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala					
30		35		40	45
Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro					
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Gly Asn Glu Asn Asp Phe Leu					
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1 5 10 15

ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg 96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca 192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

tgc 195
Cys
65

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<400> 4

Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys 1
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

Cys
65

<210> 5
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<220>
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In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

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aca gtg tgg gca aag gaa ggt tat ctg gta agc aag agc acg ggc tgc      96
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys
    -1      1                      5                      10

aaa tac gag tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa      144
Lys Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu
    15                      20                      25

tgc aaa gcg ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc      192
Cys Lys Ala Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe
    30                      35                      40

gca tgc tgg tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att      240
Ala Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile
    45                      50                      55                      60

cct ggt aaa tca tgc ggc aaa aaa taatgaaaac gacttttat tgtccaccaa      294
Pro Gly Lys Ser Cys Gly Lys Lys
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cagaaaatatt gtaacgcttc taa                                         317

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Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly Thr
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Val Trp Ala Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys
    -1      1                      5                      10
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Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala
30 35 40 45

Cys Trp Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro
50 55 60

Gly Lys Ser Cys Gly Lys Lys
65

<210> 7
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<220>
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<400> 7
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Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg 96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca 192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

tgc
Cys
65 195

<210> 8
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<400> 8

Lys Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
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Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro

20

25

30

Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

Cys
65

<210> 9
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<212> DNA
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In the mature peptide, the last 2 basic aminoacids are cut

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aag atg aac tcg ttg atg atc act act tgt ttg att cta gtc ggt 48
Met Asn Ser Leu Leu Met Ile Thr Thr Cys Leu Ile Leu Val Gly
-15 -10 -5

acc gtg tgg gca aac gat ggt tat ttg ttt gac aag aga aag cgc tgc 96
Thr Val Trp Ala Asn Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys
-1 1 5 10

aca ctc gaa tgc ata gac aag aca gga gac aaa aat tgc gat aga aat 144
Thr Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn
15 20 25

tgc aag aag gaa gga ggt agt ttt ggc aaa tgc tct tat tct gca tgc 192
Cys Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Ser Ala Cys
30 35 40

tgg tgc aaa gga ttg ccc gga att aca ccg att tca cgt act cct ggt 240
Trp Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly

	45	50	55	60	
aaa aca tgt aga aaa taatggcaac ttgttttat tgtgcaccaa cagaaatatt					295
Lys Thr Cys Arg Lys					
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gtaacgcttc ttaattgc					313
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-15		-10		-5	
Val Trp Ala Asn Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr					
-1 1		5		10	
Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys					
15		20		25	
Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Ser Ala Cys Trp					
30		35		40	45
Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys					
50		55		60	
Thr Cys Arg Lys					
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1		5		10	15
acc gtg tgg gca aac gat ggt tat ttg ttt gac aag aga aag cgc tgc					96
Thr Val Trp Ala Asn Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys					
20		25		30	
aca ctc gaa tgc ata gac aag aca gga gac aaa aat tgc gat aga aat					144
Thr Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn					

35

40

45

tgc aag aag gaa gga ggt agt ttt ggc aaa tgc tct tat tct gca tgc	192
Cys Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Ser Ala Cys	
50 55 60	
tgg tgc aaa gga ttg ccc gga att aca ccg att tca cgt act cct ggt	240
Trp Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly	
65 70 75 80	
aaa aca tgt	249
Lys Thr Cys	

<210> 12

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<213> Centruroides exilicauda

<400> 12

Lys Met Asn Ser Leu Leu Met Ile Thr Thr Cys Leu Ile Leu Val Gly	
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Thr Val Trp Ala Asn Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys	
20 25 30	

Thr Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn	
35 40 45	

Cys Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Ser Ala Cys	
50 55 60	

Trp Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly	
65 70 75 80	

Lys Thr Cys

<210> 13

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Ala Thr Gly Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Ile Ile Lys
-5 -1 1 5

acg ggc tgc aaa tac aat tgc tat ata ttg gga aaa aac aaa tac tgc 96
Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
10 15 20 25

aat tcg gaa tgc aaa gag gta ggt gct ggt tac ggc tat tgc tat gct 144
Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
30 35 40

ttt ggg tgc tgg tgc gaa gga tta ccc gaa agt ata ccg acc tgg ccc 192
Phe Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Ile Pro Thr Trp Pro
45 50 55

ctt cct gat aaa aca tgt ggc aca aaa taatggcaac gtcttttat 239
Leu Pro Asp Lys Thr Cys Gly Thr Lys
60 65

tgtccaccaa cagaaaatatt gtaacgcttc ttaa 273

<210> 14
<211> 73
<212> PRT
<213> Centruroides exilicauda

<400> 14
Ala Thr Gly Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Ile Ile Lys 48
-5 -1 1 5

Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
10 15 20 25

Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
30 35 40

Phe Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Ile Pro Thr Trp Pro
45 50 55

Leu Pro Asp Lys Thr Cys Gly Thr Lys
60 65

<210> 15
<211> 219
<212> DNA
<213> Centruroides exilicauda

<220>
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<222> (1)...(219)
<223> Product= Sodium-channel modifier toxin

<400> 15
gct aca gga aat gtg tgg gca aag gac ggt tat ctg gtg atc att aaa 48
Ala Thr Gly Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Ile Ile Lys
1 5 10 15

acg ggc tgc aaa tac aat tgc tat ata ttg gga aaa aac aaa tac tgc 96
Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
20 25 30

aat tcg gaa tgc aaa gag gta ggt gct ggt tac ggc tat tgc tat gct 144
Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
35 40 45

ttt ggg tgc tgg tgc gaa gga tta ccc gaa agt ata ccg acc tgg ccc 192
Phe Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Ile Pro Thr Trp Pro
50 55 60

ctt cct gat aaa aca tgt ggc aca aaa 219
Leu Pro Asp Lys Thr Cys Gly Thr Lys
65 70

<210> 16
<211> 73
<212> PRT
<213> Centruroides exilicauda

<400> 16
Ala Thr Gly Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Ile Ile Lys
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Thr Gly Cys Lys Tyr Asn Cys Tyr Ile Leu Gly Lys Asn Lys Tyr Cys
20 25 30

Asn Ser Glu Cys Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala
35 40 45

Phe Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Ile Pro Thr Trp Pro
50 55 60

Leu Pro Asp Lys Thr Cys Gly Thr Lys
65 70

<210> 17
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<212> DNA
<213> Centruroides exilicauda

<220>
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<222> (1)..(207)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

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<222> (1)..(3)
<223> Carboxy-end of the signal peptide

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<222> (4)..()
<223> Product= Sodium-channel modifier toxin

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Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1 5 10 15

tgc ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg 96
Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala
20 25 30

aag aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg 144
Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp
35 40 45

tgc gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa 192
Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys
50 55 60

tca tgc ggc aga aaa taatggcaaa gacttttat tgtccatcaa cagaaatatt 247
Ser Cys Gly Arg Lys
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gtaacgcttc ttaa 261

<210> 18
<211> 69
<212> PRT
<213> Centruroides exilicauda

<400> 18
Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1 5 10 15

Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala
20 25 30

Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp
35 40 45

Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys
50 55 60

Ser Cys Gly Arg Lys
65

<210> 19
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<212> DNA
<213> Centruroides exilicauda

<220>
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Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag 96
Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc ggc aga aaa 204
Cys Gly Arg Lys
65

<210> 20
<211> 68
<212> PRT
<213> Centruroides exilicauda

<400> 20

Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys Gly Arg Lys
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<210> 21
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<212> DNA
<213> Centruroides exilicauda

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and the last 2 basic aminoacids are cut

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-15 -10 -5

gtg tgg gca aag gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa 96
Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

tac gag tgc ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc 144
Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys
15 20 25

aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca 192
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
30 35 40 45

tgc tgg tgc gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct 240
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro
50 55 60

aat aaa tca tgc ggc aga aaa taatggcaaa gacttttat tgtccatcaa 291
Asn Lys Ser Cys Gly Arg Lys
65

cagaaatatt gtaacgcttc tta 314

<210> 22
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<213> Centruroides exilicauda

<400> 22

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Phe Leu Ile Gly Thr
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Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Glu Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Gly Arg Lys
65

<210> 23
<211> 195
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<220>
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<400> 23

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1 5 10 15

ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag 96
Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys 144
35 40 45

gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc 195
Cys
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<210> 24
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<212> PRT
<213> Centruroides exilicauda

<400> 24

Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys
65

<210> 25
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<220>
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<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
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<222> (211)..(261)
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<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide

<222> (1)..(3)
<223> Carboxy-end of the signal peptide

<400> 25
gca aag gac ggt tat ctg gta agc aag agc acg ggc tgc aaa tac gag 48
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-1 1 5 10 15

tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg 96
Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
20 25 30

ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg 144
Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
35 40 45

tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa 192
Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
50 55 60

tca tgc ggc aaa aaa taatgaaaac gacttttat tgcctccaa cagaaatatt 247
Ser Cys Gly Lys Lys
65

gtaacgcttc ttaa 261

<210> 26
<211> 69
<212> PRT
<213> Centruroides exilicauda

<400> 26
Ala Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1 5 10 15

Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
20 25 30

Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
35 40 45

Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
50 55 60

Ser Cys Gly Lys Lys
65

<210> 27
<211> 195
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS

<222> (1)..(195)
<223> Product= Sodium-channel modifier toxin

<400> 27
aag gac ggt tat ctg gta agc aag agc acg ggc tgc aaa tac gag tgc 48
Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg 96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca 192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

tgc
Cys 195
65

<210> 28
<211> 65
<212> PRT
<213> Centruroides exilicauda

<400> 28
Lys Asp Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

Cys
65

<210> 29
<211> 261
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(207)
<223> Product= Sodium-channel modifier toxin precursor

In the mature peptide, the last Cys is amidated, and the last Gly and the last 2 basic aminoacids are cut

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<220>
<221> 3'UTR
<222> (211)..(261)
<223>

<220>
<221> sig_peptide
<222> (1)..(3)
<223> Carboxy-end of the signal peptide

<220>
<221> mat_peptide
<222> (4)..()
<223> Product= Sodium-channel modifier toxin

<400> 29
gca agg gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac gag      48
Ala Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1           5           10           15

tgc ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg      96
Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala
20           25           30

aag aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg      144
Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp
35           40           45

tgc gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa      192
Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys
50           55           60

tca tgc ggc aga aaa taatggcaaa gacttttat tgtccatcaa cagaaatatt      247
Ser Cys Gly Arg Lys
65

gtaacgcttc ttaa                                         261

<210> 30
<211> 69
<212> PRT
<213> Centruroides exilicauda

<400> 30

Ala Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1           5           10           15

Cys Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala
20           25           30

Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp
35           40           45
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Cys Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys
50 55 60

Ser Cys Gly Arg Lys
65

<210> 31
<211> 195
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(195)
<223> Product= Sodium-channel modifier toxin

<400> 31
agg gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac gag tgc 48
Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa ttc tgc gat aag gaa tgc aaa gcg aag 96
Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac tct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca tcg act tat cct ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc
Cys
65 195

<210> 32
<211> 65
<212> PRT
<213> Centruroides exilicauda

<400> 32

Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Phe Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Ser Thr Tyr Pro Leu Pro Asn Lys Ser

50

55

60

Cys
65

<210> 33
<211> 261
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(207)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (211)..(261)
<223>

<220>
<221> sig_peptide
<222> (1)..(3)
<223>

<220>
<221> mat_peptide
<222> (4)..()
<223> Product= Sodium-channel modifier toxin

<400> 33
gca agg gag ggt tat ctg gta agc aag agc acg ggc tgc aaa tac gag 48
Ala Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1 5 10 15

tgc ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg 96
Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
20 25 30

ccg aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg 144
Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
35 40 45

tgc gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa 192
Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
50 55 60

tca tgc ggc aaa aaa taatggcaaa gacttttat tgtccatcaa cagaaatatt 247
Ser Cys Gly Lys Lys
65

gtaacgcttc ttaa 261

<210> 34
<211> 69

<212> PRT
<213> Centruroides exilicauda

<400> 34

Ala Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu
-1 1 5 10 15

Cys Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala
20 25 30

Pro Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp
35 40 45

Cys Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys
50 55 60

Ser Cys Gly Lys Lys
65

<210> 35
<211> 195
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)...(195)
<223> Product= Sodium-channel modifier toxin

<400> 35

agg gag ggt tat ctg gta agc aag agc acg ggc tgc aaa tac gag tgc 48
Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg ccg 96
Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

aac caa gga ggt ggt tac ggc tat tgc cac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Tyr Gly Tyr Cys His Ala Phe Ala Cys Trp Cys
35 40 45

gaa aat ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca 192
Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

tgc
Cys
65

<210> 36
<211> 65
<212> PRT
<213> Centruroides exilicauda

<400> 36

Arg Glu Gly Tyr Leu Val Ser Lys Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Pro
20 25 30

Asn Gln Gly Gly Tyr Gly Cys His Ala Phe Ala Cys Trp Cys
35 40 45

Glu Asn Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser
50 55 60

Cys
65

<210> 37
<211> 254
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(201)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (205)..(254)
<223>

<220>
<221> sig_peptide
<222> (1)..(3)
<223> Carboxy-end of the signal peptide

<220>
<221> mat_peptide
<222> (4)..()
<223> Product= Sodium-channel modifier toxin

<400> 37
gca aag gaa ggt tat ctg gtg aac ata tac acg ggc tgc aaa tac agt 48
Ala Lys Glu Gly Tyr Leu Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser
-1 1 5 10 15

tgc tgg ttg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag 96
Cys Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu
20 25 30

ata gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa 144

Ile Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu		
35	40	45
caa ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc		192
Gln Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys		
50	55	60
ggc aga aaa taagtaacgt ctttttattg tctgcgcaaa agaattattg		241
Gly Arg Lys		
65		
taacgcttct taa		254
<210> 38		
<211> 67		
<212> PRT		
<213> Centruroides exilicauda		
<400> 38		
Ala Lys Glu Gly Tyr Leu Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser		
-1 1	5	10
		15
Cys Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu		
20	25	30
Ile Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu		
35	40	45
Gln Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys		
50	55	60
Gly Arg Lys		
65		
<210> 39		
<211> 189		
<212> DNA		
<213> Centruroides exilicauda		
<220>		
<221> CDS		
<222> (1)...(189)		
<223> Product= Sodium-channel modifier toxin		
<400> 39		
aag gaa ggt tat ctg gtg aac ata tac acg ggc tgc aaa tac agt tgc		48
Lys Glu Gly Tyr Leu Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys		
1	5	10
		15
tgg ttg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag ata		96
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile		
20	25	30
gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa caa		144

Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc 189
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
50 55 60

<210> 40
<211> 63
<212> PRT
<213> Centruroides exilicauda

<400> 40

Lys Glu Gly Tyr Leu Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
1 5 10 15

Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
20 25 30

Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
50 55 60

<210> 41
<211> 254
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(204)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (205)..(254)
<223>

<400> 41
aag gac ggt tat ccg gtg gag gtc acg ggc tgc aaa aag tct tgc tat 48
Lys Asp Gly Tyr Pro Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac 96
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc 192
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

ggc aaa aaa taa tggcaacgct gttctattgg ccaccaacgg aaatatttaa 244
Gly Lys Lys
65

cgcttcttaa 254

<210> 42
<211> 67
<212> PRT
<213> Centruroides exilicauda

<400> 42

Lys Asp Gly Tyr Pro Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

Gly Lys Lys
65

<210> 43
<211> 192
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 43

aag gac ggt tat ccg gtg gag gtc acg ggc tgc aaa aag tct tgc tat 48
Lys Asp Gly Tyr Pro Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac 96
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc 192
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

<210> 44
<211> 64
<212> PRT
<213> Centruroides exilicauda

<400> 44

Lys Asp Gly Tyr Pro Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

<210> 45
<211> 258
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(204)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (205)..(258)
<223>

<400> 45
aag gac ggt tat ctg gtg gag gtc acg ggc tgc aaa aag tct tgc tat 48
Lys Asp Gly Tyr Leu Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac 96
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc 192
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

ggc aaa aaa taa tggcaacgct gttctattgg ccaccaacgg aaatatttaa 244
Gly Lys Lys
65

cgcttcttaa ttgc 258

<210> 46
<211> 67
<212> PRT
<213> Centruroides exilicauda

<400> 46

Lys Asp Gly Tyr Leu Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

Gly Lys Lys
65 .

<210> 47
<211> 192
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 47

aag gac ggt tat ctg gtg gag gtc acg ggc tgc aaa aag tct tgc tat 48
Lys Asp Gly Tyr Leu Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

aaa ttg gga gaa aac aaa ttc tgc aat agg gaa tgc aaa atg aag cac 96
Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

cga gga ggt agt tac ggc tat tgc tat ttt ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg gcc gaa agt aca ccg act tgg ccc ctt cct aat aaa tca tgc 192
Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

<210> 48
<211> 64
<212> PRT
<213> Centruroides exilicauda

<400> 48

Lys Asp Gly Tyr Leu Val Glu Val Thr Gly Cys Lys Lys Ser Cys Tyr
1 5 10 15

Lys Leu Gly Glu Asn Lys Phe Cys Asn Arg Glu Cys Lys Met Lys His
20 25 30

Arg Gly Gly Ser Tyr Gly Tyr Cys Tyr Phe Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ala Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser Cys
50 55 60

<210> 49
<211> 252
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(201)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (202)..(252)
<223>

<400> 49

aag gag ggt tat ccg gtg aac ata tac acg ggc tgc aaa tac agt tgc 48
Lys Glu Gly Tyr Pro Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
1 5 10 15

tgg ttg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag ata 96
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
20 25 30

gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa caa 144
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc ggc 192
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys Gly
50 55 60

aga aaa taa tagcaacgtc ttttattgt ctgccaaaag aattattgt 241
Arg Lys
65

acgcttctta a 252

<210> 50
<211> 66
<212> PRT
<213> Centruroides exilicauda

<400> 50

Lys Glu Gly Tyr Pro Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
1 5 10 15

Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
20 25 30

Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys Gly
50 55 60

Arg Lys
65

<210> 51
<211> 189
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(189)
<223> Product= Sodium-channel modifier toxin

<400> 51

aag gag ggt tat ccg gtg aac ata tac acg ggc tgc aaa tac agt tgc 48
Lys Glu Gly Tyr Pro Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
1 5 10 15

tgg ttg ttg gga gaa aac gaa tat tgc att gcg gaa tgc aaa gag ata 96
Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
20 25 30

gga gct ggt tac ggc tat tgc cac ggt ttt ggg tgc tgg tgc gaa caa 144
Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

ttt cca gaa aat aaa ccg tct tat ccc tat cct gaa aaa tca tgc 189
Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
50 55 60

<210> 52
<211> 63
<212> PRT

<213> Centruroides exilicauda

<400> 52

Lys Glu Gly Tyr Pro Val Asn Ile Tyr Thr Gly Cys Lys Tyr Ser Cys
1 5 10 15

Trp Leu Leu Gly Glu Asn Glu Tyr Cys Ile Ala Glu Cys Lys Glu Ile
20 25 30

Gly Ala Gly Tyr Gly Tyr Cys His Gly Phe Gly Cys Trp Cys Glu Gln
35 40 45

Phe Pro Glu Asn Lys Pro Ser Tyr Pro Tyr Pro Glu Lys Ser Cys
50 55 60

<210> 53

<211> 322

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (5) .. (265)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Asn is amidated, and the last Gl
y and the last basic aminoacid are cut

<220>

<221> mat_peptide

<222> (62) .. ()

<223> Product= Sodium-channel modifier toxin

<220>

<221> sig_peptide

<222> (5) .. (61)

<223>

<220>

<221> 3'UTR

<222> (269) .. (322)

<223>

<220>

<221> 5'UTR

<222> (1) .. (4)

<223>

<400> 53

gaag atg aat tcg ttg atg atc act gct tgt ttg gcc ctg gtc gga
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Val Gly
-15 -10 -5

49

aca gtg tgg gca aag gaa ggt tat ctg gta aac cac tcc acg ggg tgc
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn His Ser Thr Gly Cys
-1 1 5 10

97

aaa tac gaa tgc tat aaa ttg gga gac aac gat tat tgc cta agg gaa	145
Lys Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu	
15 20 25	
tgc aaa cag cag tac gga aaa ggt gct ggt ggc tat tgc tac gct ttt	193
Cys Lys Gln Gln Tyr Gly Lys Gly Ala Gly Tyr Cys Tyr Ala Phe	
30 35 40	
ggg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt	241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu	
45 50 55 60	
cct aag aaa aca tgc aac gga aaa taatggcaac gacttttat tgtccaccaa	295
Pro Lys Lys Thr Cys Asn Gly Lys	
65	
cagaaatatt gtaacgcttc ttaattg	322
<210> 54	
<211> 87	
<212> PRT	
<213> Centruroides limpidus limpidus	
<400> 54	
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Val Gly Thr	
-15 -10 -5	
Val Trp Ala Lys Glu Gly Tyr Leu Val Asn His Ser Thr Gly Cys Lys	
-1 1 5 10	
Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys	
15 20 25	
Lys Gln Gln Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly	
30 35 40 45	
Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro	
50 55 60	
Lys Lys Thr Cys Asn Gly Lys	
65	
<210> 55	
<211> 198	
<212> DNA	
<213> Centruroides limpidus limpidus	
<220>	
<221> CDS	
<222> (1)..(198)	
<223> Product= Sodium-channel modifier toxin C114	
<400> 55	

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aag gaa ggt tat ctg gta aac cac tcc acg ggg tgc aaa tac gaa tgc 48
Lys Glu Gly Tyr Leu Val Asn His Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

tat aaa ttg gga gac aac gat tat tgc cta agg gaa tgc aaa cag cag 96
Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Gln Gln
20 25 30

tac gga aaa ggt gct ggt ggc tat tgc tac gct ttt ggg tgc tgg tgc 144
Tyr Gly Lys Gly Ala Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt cct aag aaa aca 192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Thr
50 55 60

tgc aac
Cys Asn
65

<210> 56
<211> 66
<212> PRT
<213> Centruroides limpidus limpidus

<400> 56

Lys Glu Gly Tyr Leu Val Asn His Ser Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Gln Gln
20 25 30

Tyr Gly Lys Gly Ala Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Thr
50 55 60

Cys Asn
65

<210> 57
<211> 322
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (5)..(265)
<223> Product= Sodium-channel modifier toxin precursor
      In the mature peptide, the last Tyr is amidated, and the last Gl
      y and the last basic aminoacid are cut

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<221> 3'UTR
<222> (269) .. (322)
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<220>
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<222> (62) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5) .. (61)
<223>

<400> 57
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gcc gtg atc gga 49
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-15 -10 -5

aca gtg tgg gca aag gaa ggt tat att gta aac tac tac gat ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr Tyr Asp Gly Cys
-1 1 5 10

aaa tac gca tgt ctt aaa tta gga gag aac gat tat tgc tta agg gaa 145
Lys Tyr Ala Cys Leu Lys Leu Gly Glu Asn Asp Tyr Cys Leu Arg Glu
15 20 25

tgc aaa gcg aga tac tac aaa tct gct ggc ggc tat tgc tac gct ttt 193
Cys Lys Ala Arg Tyr Tyr Lys Ser Ala Gly Gly Tyr Cys Tyr Ala Phe
30 35 40

gcg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt 241
Ala Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
45 50 55 60

cct aat aaa aca tgc tac gga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Asn Lys Thr Cys Tyr Gly Lys
65

cagaaatatt gtaacgcttc ttaattg 322

<210> 58
<211> 87
<212> PRT
<213> Centruroides limpidus limpidus

<400> 58
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Val Ile Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr Tyr Asp Gly Cys Lys
-1 1 5 10

Tyr Ala Cys Leu Lys Leu Gly Glu Asn Asp Tyr Cys Leu Arg Glu Cys
15 20 25

Lys Ala Arg Tyr Tyr Lys Ser Ala Gly Gly Tyr Cys Tyr Ala Phe Ala
30 35 40 45

Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro
50 55 60

Asn Lys Thr Cys Tyr Gly Lys
65

<210> 59

<211> 198

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (1)..(198)

<223> Product= Sodium-channel modifier toxin

<400> 59

aag gaa ggt tat att gta aac tac tac gat ggc tgc aaa tac gca tgt 48
Lys Glu Gly Tyr Ile Val Asn Tyr Tyr Asp Gly Cys Lys Tyr Ala Cys
1 5 10 15

ctt aaa tta gga gag aac gat tat tgc tta agg gaa tgc aaa gcg aga 96
Leu Lys Leu Gly Glu Asn Asp Tyr Cys Leu Arg Glu Cys Lys Ala Arg
20 25 30

tac tac aaa tct gct ggc ggc tat tgc tac gct ttt gcg tgc tgg tgc 144
Tyr Tyr Lys Ser Ala Gly Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt cct aat aaa aca 192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Asn Lys Thr
50 55 60

tgc tac 198
Cys Tyr
65

<210> 60

<211> 66

<212> PRT

<213> Centruroides limpidus limpidus

<400> 60

Lys Glu Gly Tyr Ile Val Asn Tyr Tyr Asp Gly Cys Lys Tyr Ala Cys
1 5 10 15

Leu Lys Leu Gly Glu Asn Asp Tyr Cys Leu Arg Glu Cys Lys Ala Arg
20 25 30

Tyr Tyr Lys Ser Ala Gly Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Asn Lys Thr
50 55 60

Cys Tyr
65

<210> 61
<211> 322
<212> DNA
<213> Centruroides limpidus limpidus

<220>
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<222> (5)..(265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Asn is amidated, and the last Gl
y and the last basic aminoacid are cut

<220>
<221> 3'UTR
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<400> 61
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gcc ctg ata gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly
-15 -10 -5

aca gtg tgg gca aag gaa ggt tat att gta aac tac cac gat ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys
-1 1 5 10

aaa tac gaa tgc tat aaa ttg gga gac aac gat tat tgc tta agg gaa 145
Lys Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
15 20 25

tgc aaa ttg aga tac gga aaa ggt gct ggc ggc tat tgc tac gct ttt 193
Cys Lys Leu Arg Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe

30	35	40	
ggg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt			241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu			
45	50	55	60
cca aag aaa aga tgc aat gga aaa taatggcaac gacttttat tgtccaccaa			295
Pro Lys Lys Arg Cys Asn Gly Lys			
65			
cagaaatatt gtaacgcttc ttaattg			322
<210> 62			
<211> 87			
<212> PRT			
<213> Centruroides limpidus limpidus			
<400> 62			
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly Thr			
-15	-10		-5
Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys			
-1 1 5 10			
Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys			
15 20 25			
Lys Leu Arg Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly			
30 35 40 45			
Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro			
50 55 60			
Lys Lys Arg Cys Asn Gly Lys			
65			
<210> 63			
<211> 198			
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<222> (1)...(198)			
<223> Product= Sodium-channel modifier toxin			
<400> 63			
aag gaa ggt tat att gta aac tac cac gat ggc tgc aaa tac gaa tgc			48
Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys Tyr Glu Cys			
1 5 10 15			
tat aaa ttg gga gac aac gat tat tgc tta agg gaa tgc aaa ttg aga			96
Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg			

	20	25	30	
tac gga aaa ggt gct ggc ggc tat tgc tac gct ttt ggg tgc tgg tgc				144
Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys				
35	40	45		
aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt cca aag aaa aga				192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Arg				
50	55	60		
tgc aat				198
Cys Asn				
65				
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<212> PRT				
<213> Centruroides limpidus limpidus				
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Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys Tyr Glu Cys				
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Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg				
20	25	30		
Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys				
35	40	45		
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Arg				
50	55	60		
Cys Asn				
65				
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<222> (5) .. (265)				
<223> Product= Sodium-channel modifier toxin precursor				
In the mature peptide, the last 2 basic aminoacids are cut				
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<222> (5)..(61)

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<400> 65

gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gcc gag atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Glu Ile Gly
-15 -10 -5

aca gtg tgg gca aaa gaa ggt tat ctg gta aac aag acg acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac ggt tgc ttc tgg ttg gga aaa aac gaa aac tgc gat aag gaa 145
Lys Tyr Gly Cys Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu
15 20 25

tgc aaa gcg aaa aac caa gga ggt agt tac ggc tat tgc tac tct ttt 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe
30 35 40

gcc tgc tgg tgc gaa ggt ttg ccc gat agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tcg tgc agc aaa aaa taatggcaac gtcttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Ser Lys Lys
65

cagaaatatt gtaacgcttc ttaattg 322

<210> 66

<211> 87

<212> PRT

<213> Centruroides limpidus limpidus

<400> 66

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Glu Ile Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Gly Cys Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Ser Lys Lys
65

<210> 67
<211> 198
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(198)
<223> Product= Sodium-channel modifier toxin

<400> 67
aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac ggt tgc 48
Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

ttc tgg ttg gga aaa aac gaa aac tgc gat aag gaa tgc aaa gcg aaa 96
Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac tct ttt gcc tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gat agt aca ccg act tat ccc ctt cct aat aaa tcg 192
Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc agc 198
Cys Ser
65

<210> 68
<211> 66
<212> PRT
<213> Centruroides limpidus limpidus

<400> 68

Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser

50 55 60

Cys Ser
65

<210> 69
<211> 322
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last 2 basic aminoacids are cut

<220>
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<222> (269) .. (322)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
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<222> (62) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5) .. (61)
<223>

<400> 69
gaag atg aat tcg ttg atg atc act gct tgt ttg gtc cta ttc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly
-15 -10 -5

aca gtg tgg gca aaa gaa ggt tat ctg gta aac aag acg acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac ggt tgc ttc tgg ttg gga aaa aac gaa aac tgc gat atg gaa 145
Lys Tyr Gly Cys Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu
15 20 25

tgc aaa gcg aaa aac caa gga ggt agt tac ggc tat tgc tac tct ttt 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe
30 35 40

gcc tgc tgg tgc gaa ggt ttg ccc gat agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tcg tgc agc aaa aaa taatggcaac gtcttttat tgtccaccaa 295

Pro Asn Lys Ser Cys Ser Lys Lys
65

cagaaatatt gtaacgcttc ttaattg

322

<210> 70

<211> 87

<212> PRT

<213> Centruroides limpidus limpidus

<400> 70

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Gly Cys Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Ser Lys Lys
65

<210> 71

<211> 198

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (1)..(198)

<223> Product= Sodium-channel modifier toxin

<400> 71

aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac ggt tgc
Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

48

ttc tgg ttg gga aaa aac gaa aac tgc gat atg gaa tgc aaa gcg aaa
Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu Cys Lys Ala Lys
20 25 30

96

aac caa gga ggt agt tac ggc tat tgc tac tct ttt gcc tgc tgg tgc
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

144

gaa ggt ttg ccc gat agt aca ccg act tat ccc ctt cct aat aaa tcg

192

Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc agc 198
Cys Ser
65

<210> 72
<211> 66
<212> PRT
<213> Centruroides limpidus limpidus

<400> 72

Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu Asn Cys Asp Met Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Asp Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys Ser
65

<210> 73
<211> 316
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (5) .. (259)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Ser is amidated, and the last Gly
and the last basic aminoacid are cut

<220>
<221> 3'UTR
<222> (263) .. (316)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
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<222> (62) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5)..(61)
<223>

<400> 73
gaag atg aac tcg ttg ttg atg att att ggt tgg gtc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Ile Gly Cys Leu Val Leu Ile Gly
-15 -10 -5

aca gtg tgg aca aag gaa ggt tat ctg gtg aac atg aaa acg ggc tgc 97
Thr Val Trp Thr Lys Glu Gly Tyr Leu Val Asn Met Lys Thr Gly Cys
-1 1 5 10

aaa tac ggg tgc tat gaa ttg ggt gac aac ggt tac tgc gat agg aaa 145
Lys Tyr Gly Cys Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys
15 20 25

tgc aaa gcg gag agc ggt aac tac ggc tat tgc tat act gtt ggg tgc 193
Cys Lys Ala Glu Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys
30 35 40

tgg tgc gaa gga ttg ccc aat agt aaa ccg act tgg ccc ctt cct ggt 241
Trp Cys Glu Gly Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly
45 50 55 60

aaa tca tgc agc gga aaa taatagcaac gtcttttat tgtccaccaa 289
Lys Ser Cys Ser Gly Lys
65

cagaaatatt gtaacgcttc ttaattg 316

<210> 74
<211> 85
<212> PRT
<213> Centruroides limpidus limpidus

<400> 74
Met Asn Ser Leu Leu Met Ile Ile Gly Cys Leu Val Leu Ile Gly Thr
-15 -10 -5

Val Trp Thr Lys Glu Gly Tyr Leu Val Asn Met Lys Thr Gly Cys Lys
-1 1 5 10

Tyr Gly Cys Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys Cys
15 20 25

Lys Ala Glu Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys Trp
30 35 40 45

Cys Glu Gly Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly Lys
50 55 60

Ser Cys Ser Gly Lys

65

<210> 75
<211> 192
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 75
aag gaa ggt tat ctg gtg aac atg aaa acg ggc tgc aaa tac qgg tgc 48
Lys Glu Gly Tyr Leu Val Asn Met Lys Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

tat gaa ttg ggt gac aac ggt tac tgc gat agg aaa tgc aaa gcg gag 96
Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys Cys Lys Ala Glu
20 25 30

agc ggt aac tac ggc tat tgc tat act gtt ggg tgc tgg tgc gaa gga 144
Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys Trp Cys Glu Gly
35 40 45

ttg ccc aat agt aaa ccg act tgg ccc ctt cct ggt aaa tca tgc agc 192
Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly Lys Ser Cys Ser
50 55 60

<210> 76
<211> 64
<212> PRT
<213> Centruroides limpidus limpidus

<400> 76
Lys Glu Gly Tyr Leu Val Asn Met Lys Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

Tyr Glu Leu Gly Asp Asn Gly Tyr Cys Asp Arg Lys Cys Lys Ala Glu
20 25 30

Ser Gly Asn Tyr Gly Tyr Cys Tyr Thr Val Gly Cys Trp Cys Glu Gly
35 40 45

Leu Pro Asn Ser Lys Pro Thr Trp Pro Leu Pro Gly Lys Ser Cys Ser
50 55 60

<210> 77
<211> 316
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS

<222> (5)..(259)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (263)..(316)
<223>

<220>
<221> 5'UTR
<222> (1)..(4)
<223>

<220>
<221> mat_peptide
<222> (62)..()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5)..(61)
<223>

<400> 77
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc cta ttc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly
-15 -10 -5

aca gtg tgg gca aag gaa ggt tat ctg gtg aac acg tac acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Thr Tyr Thr Gly Cys
-1 1 5 10

aaa tac att tgc tgg aaa ttg gga gag aac aaa tac tgc att gat gaa 145
Lys Tyr Ile Cys Trp Lys Leu Gly Glu Asn Lys Tyr Cys Ile Asp Glu
15 20 25

tgt aaa gag ata gga gct ggt tac ggc tat tgc tac ggt ttt ggg tgc 193
Cys Lys Glu Ile Gly Ala Gly Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys
30 35 40

tat tgc gaa gga ttt ccc gaa aat aaa ccg acc tgg ccc ctt cct aat 241
Tyr Cys Glu Gly Phe Pro Glu Asn Lys Pro Thr Trp Pro Leu Pro Asn
45 50 55 60

aaa aca tgc ggc aga aaa taatgacaac gtcttttat tgtccaccaa 289
Lys Thr Cys Gly Arg Lys
65

cagaaatatt gtaacgcttc ttaattg 316

<210> 78
<211> 85
<212> PRT
<213> Centruroides limpidus limpidus

<400> 78

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Thr Tyr Thr Gly Cys Lys
-1 1 5 10

Tyr Ile Cys Trp Lys Leu Gly Glu Asn Lys Tyr Cys Ile Asp Glu Cys
15 20 25

Lys Glu Ile Gly Ala Gly Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr
30 35 40 45

Cys Glu Gly Phe Pro Glu Asn Lys Pro Thr Trp Pro Leu Pro Asn Lys
50 55 60

Thr Cys Gly Arg Lys
65

<210> 79

<211> 189

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (1)...(189)

<223> Product= Sodium-channel modifier toxin

<400> 79

aag gaa ggt tat ctg gtg aac acg tac acg ggc tgc aaa tac att tgc
Lys Glu Gly Tyr Leu Val Asn Thr Tyr Thr Gly Cys Lys Tyr Ile Cys
1 5 10 15

tgg aaa ttg gga gag aac aaa tac tgc att gat gaa tgt aaa gag ata
Trp Lys Leu Gly Glu Asn Lys Tyr Cys Ile Asp Glu Cys Lys Glu Ile
20 25 30

gga gct ggt tac ggc tat tgc tac ggt ttt ggg tgc tat tgc gaa gga
Gly Ala Gly Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu Gly
35 40 45

ttt ccc gaa aat aaa ccg acc tgg ccc ctt cct aat aaa aca tgc
Phe Pro Glu Asn Lys Pro Thr Trp Pro Leu Pro Asn Lys Thr Cys
50 55 60

<210> 80

<211> 63

<212> PRT

<213> Centruroides limpidus limpidus

<400> 80

Lys Glu Gly Tyr Leu Val Asn Thr Tyr Thr Gly Cys Lys Tyr Ile Cys
1 5 10 15

Trp Lys Leu Gly Glu Asn Lys Tyr Cys Ile Asp Glu Cys Lys Glu Ile
20 25 30

Gly Ala Gly Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu Gly
35 40 45

Phe Pro Glu Asn Lys Pro Thr Trp Pro Leu Pro Asn Lys Thr Cys
50 55 60

<210> 81
<211> 274
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (2)..(217)
<223> Product= Sodium-channel modifier toxin precursor

In the mature peptide, the last Cys is amidated, and the last
Gly and the last 2 basic aminoacids are cut

<220>
<221> sig_peptide
<222> (2)..(13)
<223> Carboxy-end of the signal peptide

<220>
<221> mat_peptide
<222> (14)..()
<223> Product= Sodium-channel modifier toxin

<220>
<221> 3'UTR
<222> (221)..(274)

<400> 81
a aca gtg tcg gca aaa gaa ggt tat ctg gtg aag aag agc aat ggt tgc 49
Thr Val Ser Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asn Gly Cys
-1 1 5 10

aaa tac gag tgc ttt aaa ttg gga gaa aac gaa cac tgc gat acg gaa 97
Lys Tyr Glu Cys Phe Lys Leu Gly Glu Asn Glu His Cys Asp Thr Glu
15 20 25

tgc aaa gcg ccg aac caa gga ggt agt tac ggc tat tgc gac act ttt 145
Cys Lys Ala Pro Asn Gln Gly Ser Tyr Gly Tyr Cys Asp Thr Phe
30 35 40

gag tgt tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tgg cct ctt 193
Glu Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Trp Pro Leu
45 50 55 60

cct aat aaa tca tgc ggc aaa aaa taatggcaac gtcttttat tgtccaccaa 247
Pro Asn Lys Ser Cys Gly Lys Lys
65

cagaaaatatt gtaacgcttc ttaattg 274

<210> 82
<211> 72
<212> PRT
<213> Centruroides limpidus limpidus

<400> 82

Thr Val Ser Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asn Gly Cys
-1 1 5 10

Lys Tyr Glu Cys Phe Lys Leu Gly Glu Asn Glu His Cys Asp Thr Glu
15 20 25

Cys Lys Ala Pro Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Asp Thr Phe
30 35 40

Glu Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Trp Pro Leu
45 50 55 60

Pro Asn Lys Ser Cys Gly Lys Lys
65

<210> 83
<211> 195
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(195)
<223> Product= Sodium-channel modifier toxin

<400> 83

aaa gaa ggt tat ctg gtg aag aag agc aat ggt tgc aaa tac gag tgc 48
Lys Glu Gly Tyr Leu Val Lys Ser Asn Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt aaa ttg gga gaa aac gaa cac tgc gat acg gaa tgc aaa gcg ccg 96
Phe Lys Leu Gly Glu Asn Glu His Cys Asp Thr Glu Cys Lys Ala Pro
20 25 30

aac caa gga ggt agt tac ggc tat tgc gac act ttt gag tgt tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Asp Thr Phe Glu Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tgg cct ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser
50 55 60

tgc 195
Cys
65

<210> 84

<211> 65

<212> PRT

<213> Centruroides limpidus limpidus

<400> 84

Lys Glu Gly Tyr Leu Val Lys Lys Ser Asn Gly Cys Lys Tyr Glu Cys
1 5 10 15

Phe Lys Leu Gly Glu Asn Glu His Cys Asp Thr Glu Cys Lys Ala Pro
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Asp Thr Phe Glu Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Ser
50 55 60

Cys
65

<210> 85

<211> 323

<212> DNA

<213> Centruroides noxius

<220>

<221> CDS

<222> (5) .. (265)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Asn is amidated, and the last Gly
and the last basic aminoacid are cut

<220>

<221> 3'UTR

<222> (269) .. (323)

<223>

<220>

<221> 5'UTR

<222> (1) .. (4)

<223>

<220>

<221> mat_peptide

<222> (62) .. ()

<223> Product= Sodium-channel modifier toxin

<220>

<221> sig_peptide

<222> (5) .. (61)

<223>

<400> 85

gaag atg aac tcg ttg atg atc act gct tgt ttg gcc ctg gtc gga Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Val Gly -15 -10 -5	49
aca gtg tgg tca aag gaa ggt tat ata gta aac tcg tac acg ggc tgc Thr Val Trp Ser Lys Glu Gly Tyr Ile Val Asn Ser Tyr Thr Gly Cys -1 1 5 10	97
aaa tac gaa tgc ttg aaa ttg gga gac aac gat tat tgc ttg agg gaa Lys Tyr Glu Cys Leu Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu 15 20 25	145
tgc aaa cag cag tac gga aaa ggt gct ggc ggc tat tgt tac gct ttt Cys Lys Gln Gln Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe 30 35 40	193
ggg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu 45 50 55 60	241
aaa aat aag aca tgc aac gga aaa taatggcaac gacttttat tgcccaccaa Lys Asn Lys Thr Cys Asn Gly Lys 65	295
cagaaatatt gtaacgcttc ttaattgg	323
<210> 86 <211> 87 <212> PRT <213> Centruroides noxius	
<400> 86	
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Val Gly Thr -15 -10 -5	
Val Trp Ser Lys Glu Gly Tyr Ile Val Asn Ser Tyr Thr Gly Cys Lys -1 1 5 10	
Tyr Glu Cys Leu Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys 15 20 25	
Lys Gln Gln Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly 30 35 40 45	
Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Lys 50 55 60	
Asn Lys Thr Cys Asn Gly Lys	

<210> 87
<211> 198
<212> DNA
<213> *Centruroides noxius*

<220>
<221> CDS
<222> (1)..(198)
<223> Product= Sodium-channel modifier toxin

<400> 87
aag gaa ggt tat ata gta aac tcg tac acg ggc tgc aaa tac gaa tgc 48
Lys Glu Gly Tyr Ile Val Asn Ser Tyr Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttg aaa ttg gga gac aac gat tat tgc ttg agg gaa tgc aaa cag cag 96
Leu Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Gln Gln
20 25 30

tac gga aaa ggt gct ggc ggc tat tgt tac gct ttt ggg tgc tgg tgc 144
Tyr Gly Lys Gly Ala Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt aaa aat aag aca 192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Lys Asn Lys Thr
50 55 60

tgc aac 198
Cys Asn
65

<210> 88
<211> 66
<212> PRT
<213> Centruroides noxius

<400> 88
Lys Glu Gly Tyr Ile Val Asn Ser Tyr Thr Gly Cys Lys Tyr Glu Cys 88
1 5 10 15

Leu Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Gln Gln
20 25 30

Tyr Gly Lys Gly Ala Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Lys Asn Lys Thr
50 55 60

Cys Asn
65

<210> 89
<211> 323
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS

<222> (5)..(265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Ser is amidated, and the last Gly
and the last basic aminoacid are cut

<220>
<221> 3'UTR
<222> (269)..(323)
<223>

<220>
<221> 5'UTR
<222> (1)..(4)
<223>

<220>
<221> mat_peptide
<222> (62)..()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5)..(61)
<223>

<400> 89
gaag atg aat tcg ttg atg atc act gct tgt ttg gtc ctg atc gga 49
Met Asn Ser Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-15 -10 -5

aca gtg tgc gca aag gaa ggt tat ctg gtg aac aaa agc aca ggc tgt 97
Thr Val Cys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac aac tgc ttg ata ttg gga gaa aac aaa aac tgc gat atg gaa 145
Lys Tyr Asn Cys Leu Ile Leu Gly Glu Asn Lys Asn Cys Asp Met Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac gga ttt 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe
30 35 40

ggg tgc tat tgt gaa gga ttg tcc gat agt aca ccg act tgg ccc ctt 241
Gly Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu
45 50 55 60

cct aat aaa aca tgc agc gga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Asn Lys Thr Cys Ser Gly Lys
65

cagaaatagt gtaacgcttc ttaattgc 323

<210> 90
<211> 87
<212> PRT
<213> Centruroides noxius

<400> 90

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
-15 -10 -5

Val Cys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Asn Cys Leu Ile Leu Gly Glu Asn Lys Asn Cys Asp Met Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly
30 35 40 45

Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro
50 55 60

Asn Lys Thr Cys Ser Gly Lys
65

<210> 91
<211> 198
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS
<222> (1) .. (198)
<223> Product= Sodium-channel modifier toxin

<400> 91
aag gaa ggt tat ctg gtg aac aaa agc aca ggc tgt aaa tac aac tgc 48
Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Asn Cys
1 5 10 15

ttg ata ttg gga gaa aac aaa aac tgc gat atg gaa tgc aaa gcg aag 96
Leu Ile Leu Gly Glu Asn Lys Asn Cys Asp Met Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac gga ttt ggg tgc tat tgt 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys
35 40 45

gaa gga ttg tcc gat agt aca ccg act tgg ccc ctt cct aat aaa aca 192
Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Thr
50 55 60

tgc agc
Cys Ser
65 198

<210> 92
<211> 66
<212> PRT
<213> Centruroides noxius

<400> 92

Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Asn Cys
1 5 10 15

Leu Ile Leu Gly Glu Asn Lys Asn Cys Asp Met Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys
35 40 45

Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Thr
50 55 60

Cys Ser
65

<210> 93
<211> 323
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Asn is amidated, and the last Gly
and the last basic aminoacid are cut

<220>
<221> 3'UTR
<222> (269) .. (323)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
<221> mat_peptide
<222> (68) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5) .. (67)
<223>

<400> 93
gaag atg aac tcg ttg atg atc act gct tgt ttg gcc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly
-20 -15 -10

aca gtg tgg gca aag gaa ggt tat att gta aac tac cac gat ggc tgc 97

Thr Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys
-5 -1 1 5 10

aaa tac gaa tgc tat aaa ttg gga gat aac gat tat tgc cta agg gaa 145
Lys Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
15 20 25

tgc aaa ttg aga tac gga aaa ggt gct ggc ggc tat tgc tac gct ttt 193
Cys Lys Leu Arg Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe
30 35 40

ggg tgc tgg tgc aca cat ttg tac gaa caa gcg gtg gtc tgg ccc ctt 241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
45 50 55

cct aaa aaa aga tgc aat gga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Lys Lys Arg Cys Asn Gly Lys
60 65

cagaaatatt gtaacgcttc ttaattgc 323

<210> 94
<211> 87
<212> PRT
<213> Centruroides elegans

<400> 94

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Ala Leu Ile Gly Thr
-20 -15 -10

Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys
-5 -1 1 5 10

Tyr Glu Cys Tyr Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys
15 20 25

Lys Leu Arg Tyr Gly Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly
30 35 40

Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro
45 50 55

Lys Lys Arg Cys Asn Gly Lys
60 65

<210> 95
<211> 192
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 95
ggt tat att gta aac tac cac gat ggc tgc aaa tac gaa tgc tat aaa 48
Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys Tyr Glu Cys Tyr Lys
1 5 10 15

ttg gga gat aac gat tat tgc cta agg gaa tgc aaa ttg aga tac gga 96
Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg Tyr Gly
20 25 30

aaa ggt gct ggc ggc tat tgc tac gct ttt ggg tgc tgg tgc aca cat 144
Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Thr His
35 40 45

ttg tac gaa caa gcg gtg gtc tgg ccc ctt cct aaa aaa aga tgc aat 192
Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Arg Cys Asn
50 55 60

<210> 96
<211> 64
<212> PRT
<213> Centruroides elegans

<400> 96
Gly Tyr Ile Val Asn Tyr His Asp Gly Cys Lys Tyr Glu Cys Tyr Lys 1
1 5 10 15

Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg Tyr Gly
20 25 30

Lys Gly Ala Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Thr His
35 40 45

Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Arg Cys Asn
50 55 60

<210> 97
<211> 323
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (269) .. (323)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)

<223>

<220>

<221> mat_peptide

<222> (68)..()

<223> Product= Sodium-channel modifier toxin

<220>

<221> sig_peptide

<222> (5)..(67)

<223>

<400> 97

gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc cta ttc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly
-20 -15 -10

aca gtg aaa gca aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc 97
Thr Val Lys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-5 -1 1 5 10

aaa tac ggt tgc ctc ttg tta aga aaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Gly Cys Leu Leu Arg Lys Asn Glu Gly Cys Asp Lys Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac tct ttt 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55

cct aat aaa tca tgc agc aaa aaa taatggcaac gatttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Ser Lys Lys
60 65

cagaaatatt gtaacgcttc ttaatttc 323

<210> 98

<211> 87

<212> PRT

<213> Centruroides elegans

<400> 98

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
-20 -15 -10

Val Lys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-5 -1 1 5 10

Tyr Gly Cys Leu Leu Arg Lys Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala
30 35 40

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
45 50 55

Asn Lys Ser Cys Ser Lys Lys
60 65

<210> 99
<211> 192
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 99
ggt tat ctg gta aac aag agc acg ggc tgc aaa tac ggt tgc ctc ttg 48
Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys Leu Leu
1 5 10 15

tta aga aaa aac gaa ggc tgc gat aag gaa tgc aaa gcg aag aac caa 96
Leu Arg Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys Asn Gln
20 25 30

gga ggt agt tac ggc tat tgc tac tct ttt gca tgc tgg tgc gaa ggt 144
Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys Glu Gly
35 40 45

ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca tgc agc 192
Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser Cys Ser
50 55 60

<210> 100
<211> 64
<212> PRT
<213> Centruroides elegans

<400> 100

Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys Leu Leu
1 5 10 15

Leu Arg Lys Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys Asn Gln
20 25 30

Gly Gly Ser Tyr Gly Tyr Cys Tyr Ser Phe Ala Cys Trp Cys Glu Gly
35 40 45

Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser Cys Ser
50 55 60

<210> 101

<211> 323
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (269) .. (323)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
<221> mat_peptide
<222> (65) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5) .. (64)
<223>

<400> 101
gaag atg aat tcg ttg ttg atg atc act gct tgc ttg gtc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-20 -15 -10

aca gtg tgt gca aag gaa ggt tat ctg gta aac aag agc acg ggc tgc 97
Thr Val Cys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-5 -1 1 5 10

aaa tac agt tgc gtg tta ttg gga aaa aac gaa aac tgc gat aag gaa 145
Lys Tyr Ser Cys Val Leu Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac gct ttt 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

ggg tgc tgg tgt gaa gga ttg ccc gaa agt aca ccg act tat ccc att 241
Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile
45 50 55

cct ggt aaa tca tgc ggc aga aaa taacggcaac gatattttat tgtttaccaa 295
Pro Gly Lys Ser Cys Gly Arg Lys
60 65

cagaaatatt gtaacgcttc ttaatttc 323

<210> 102

<211> 87
<212> PRT
<213> Centruroides elegans

<400> 102

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
-20 -15 -10 -5

Val Cys Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Ser Cys Val Leu Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly
30 35 40

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro
45 50 55 60

Gly Lys Ser Cys Gly Arg Lys
65

<210> 103
<211> 192
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(192)
<223> Product= Sodium-channel modifier toxin

<400> 103
gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac agt tgc gtg 48
Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys Val
1 5 10 15

tta ttg gga aaa aac gaa aac tgc gat aag gaa tgc aaa gcg aag aac 96
Leu Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys Lys Ala Lys Asn
20 25 30

caa gga ggt agt tac ggc tat tgc tac gct ttt ggg tgc tgg tgt gaa 144
Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Glu
35 40 45

gga ttg ccc gaa agt aca ccg act tat ccc att cct ggt aaa tca tgc 192
Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser Cys
50 55 60

<210> 104
<211> 64
<212> PRT

<213> Centruroides elegans

<400> 104

Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys Val
1 5 10 15

Leu Leu Gly Lys Asn Glu Asn Cys Asp Lys Glu Cys Lys Ala Lys Asn
20 25 30

Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Glu
35 40 45

Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser Cys
50 55 60

<210> 105

<211> 323

<212> DNA

<213> Centruroides elegans

<220>

<221> CDS

<222> (5) .. (265)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>

<221> 3'UTR

<222> (269) .. (323)

<223>

<220>

<221> 5'UTR

<222> (1) .. (4)

<223>

<220>

<221> mat_peptide

<222> (65) .. ()

<223> Product= Sodium-channel modifier toxin Ce6b

<220>

<221> sig_peptide

<222> (5) .. (64)

<223>

<400> 105

gaag atg aat tcg ttg atg atc act gct tgt ttg gtc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-20 -15 -10

aca gtt tgc gca aag gat ggt tat ctg gta aac aag agc acg ggc tgc 97
Thr Val Cys Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-5 -1 1 5 10

aaa tac agt tgc ggg aaa ttg gga gaa aac gaa cac tgc gat aag gaa	145
Lys Tyr Ser Cys Gly Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu	
15 20 25	
tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tat gct ttt	193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe	
30 35 40	
ggg tgc tgg tgt gaa gga ttg ccc gaa agt acc ccg act tat ccc att	241
Gly Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile	
45 50 55	
cct ggt aaa tca tgc ggc aga aaa taacggcaac gatattttat tgtttaccaa	295
Pro Gly Lys Ser Cys Gly Arg Lys	
60 65	
cagaaatatt gtaacgcttc ttaattgc	323
<210> 106	
<211> 87	
<212> PRT	
<213> Centruroides elegans	
<400> 106	
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr	
-20 -15 -10 -5	
Val Cys Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys	
-1 1 5 10	
Tyr Ser Cys Gly Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu Cys	
15 20 25	
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly	
30 35 40	
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro	
45 50 55 60	
Gly Lys Ser Cys Gly Arg Lys	
65	
<210> 107	
<211> 192	
<212> DNA	
<213> Centruroides elegans	
<220>	
<221> CDS	
<222> (1) .. (192)	
<223> Product= Sodium-channel modifier toxin	
<400> 107	

gat ggt tat ctg gta aac aag agc acg ggc tgc aaa tac agt tgc ggg	48
Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys Gly	
1 5 10 15	
aaa ttg gga gaa aac gaa cac tgc gat aag gaa tgc aaa gcg aag aac	96
Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu Cys Lys Ala Lys Asn	
20 25 30	
caa gga ggt agt tac ggc tat tgc tat gct ttt ggg tgc tgg tgt gaa	144
Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Glu	
35 40 45	
gga ttg ccc gaa agt acc ccg act tat ccc att cct ggt aaa tca tgc	192
Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser Cys	
50 55 60	
<210> 108	
<211> 64	
<212> PRT	
<213> Centruroides elegans	
<400> 108	
Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys Gly	
1 5 10 15	
Lys Leu Gly Glu Asn Glu His Cys Asp Lys Glu Cys Lys Ala Lys Asn	
20 25 30	
Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys Glu	
35 40 45	
Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Ile Pro Gly Lys Ser Cys	
50 55 60	
<210> 109	
<211> 311	
<212> DNA	
<213> Centruroides elegans	
<220>	
<221> CDS	
<222> (5) .. (256)	
<223> Product= Sodium-channel modifier toxin precursor	
In the mature peptide, the last Cys is amidated, and the last Gly	
and the last 2 basic aminoacids are cut	
<220>	
<221> 3'UTR	
<222> (260) .. (311)	
<223>	
<220>	
<221> 5'UTR	
<222> (1) .. (4)	
<223>	

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<220>
<221> mat_peptide
<222> (59)..()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5)..(58)
<223>

<400> 109
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc cta ttc gga      49
    Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly
      -15          -10          -5

aat gtg tgg gca aag gac ggt tat ctg gtg aac aag acg ggc tgc aaa      97
Asn Val Trp Ala Lys Asp Gly Tyr Leu Val Asn Lys Thr Gly Cys Lys
    -1      1          5          10

tac aat tgc tgg ata ttg gga gaa aac aaa tac tgc aat tcg gaa tgc      145
Tyr Asn Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Ser Glu Cys
    15          20          25

aaa gag gta ggt gct ggt tac ggc tat tgc tat gct ttt ggg tgc tat      193
Lys Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Tyr
    30          35          40          45

tgc gaa gga tta ccc gaa agc gta ctg acc tgg ccc ctt tct gat aaa      241
Cys Glu Gly Leu Pro Glu Ser Val Leu Thr Trp Pro Leu Ser Asp Lys
    50          55          60

aca tgc ggc aga aaa taatggcaac gtcttttat tgtccaccaa cagaaatatt      296
Thr Cys Gly Arg Lys
    65

gtaacgcttc ttaat      311

<210> 110
<211> 84
<212> PRT
<213> Centruroides elegans

<400> 110

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Asn
      -15          -10          -5

Val Trp Ala Lys Asp Gly Tyr Leu Val Asn Lys Thr Gly Cys Lys Tyr
    -1      1          5          10

Asn Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Ser Glu Cys Lys
    15          20          25          30

Glu Val Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Tyr Cys
    35          40          45
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Glu Gly Leu Pro Glu Ser Val Leu Thr Trp Pro Leu Ser Asp Lys Thr
50 55 60

Cys Gly Arg Lys
65

<210> 111
<211> 189
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1) .. (189)
<223> Product= Sodium-channel modifier toxin

<400> 111
gca aag gac ggt tat ctg gtg aac aag acg ggc tgc aaa tac aat tgc 48
Ala Lys Asp Gly Tyr Leu Val Asn Lys Thr Gly Cys Lys Tyr Asn Cys
1 5 10 15

tgg ata ttg gga gaa aac aaa tac tgc aat tcg gaa tgc aaa gag gta 96
Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Ser Glu Cys Lys Glu Val
20 25 30

ggt gct ggt tac ggc tat tgc tat gct ttt ggg tgc tat tgc gaa gga 144
Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Tyr Cys Glu Gly
35 40 45

tta ccc gaa agc gta ctg acc tgg ccc ctt tct gat aaa aca tgc 189
Leu Pro Glu Ser Val Leu Thr Trp Pro Leu Ser Asp Lys Thr Cys
50 55 60

<210> 112
<211> 63
<212> PRT
<213> Centruroides elegans

<400> 112

Ala Lys Asp Gly Tyr Leu Val Asn Lys Thr Gly Cys Lys Tyr Asn Cys
1 5 10 15

Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Ser Glu Cys Lys Glu Val
20 25 30

Gly Ala Gly Tyr Gly Tyr Cys Tyr Ala Phe Gly Cys Tyr Cys Glu Gly
35 40 45

Leu Pro Glu Ser Val Leu Thr Trp Pro Leu Ser Asp Lys Thr Cys
50 55 60

<210> 113
<211> 323

<212> DNA
<213> *Centruroides elegans*

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 3'UTR
<222> (269) .. (323)
<223>

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
<221> mat_peptide
<222> (65) .. ()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5) .. (64)
<223>

<400> 113
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc atg ttc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Met Phe Gly
-20 -15 -10

aca gtg tgg gca aaa aaa gac ggt tat ctg gtg gac aag acg ggc tgc 97
Thr Val Trp Ala Lys Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys
-5 -1 1 5 10

aaa tac act tgc tgg ata ttg gga gaa aac aaa tac tgc aat agg gaa 145
Lys Tyr Thr Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu
15 20 25

tgc aca tgg aag cac cga gga ggt aat tac ggc tat tgc tac gga ttt 193
Cys Thr Trp Lys His Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe
30 35 40

ggg tgc tat tgc gaa gga ttg tcc gat agt aca ccg act tgg ccc ctt 241
Gly Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu
45 50 55

tct aat aaa aga tgc ggc aaa aaa taatggcaac gacttttat tgtccaccaa 295
Ser Asn Lys Arg Cys Gly Lys Lys
60 65

cagaaaatatt gtaacgcttc ttaattgc 323

<210> 114
<211> 87

<212> PRT
<213> Centruroides elegans

<400> 114

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Met Phe Gly Thr
-20 -15 -10 -5

Val Trp Ala Lys Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys
-1 1 5 10

Tyr Thr Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys
15 20 25

Thr Trp Lys His Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly
30 35 40

Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Ser
45 50 55 60

Asn Lys Arg Cys Gly Lys Lys
65

<210> 115
<211> 192
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)...(192)
<223> Product= Sodium-channel modifier toxin

<400> 115
aaa gac ggt tat ctg gtg gac aag acg ggc tgc aaa tac act tgc tgg 48
Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys Tyr Thr Cys Trp
1 5 10 15

ata ttg gga gaa aac aaa tac tgc aat agg gaa tgc aca tgg aag cac 96
Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys Thr Trp Lys His
20 25 30

cga gga ggt aat tac ggc tat tgc tac gga ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg tcc gat agt aca ccg act tgg ccc ctt tct aat aaa aga tgc 192
Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Ser Asn Lys Arg Cys
50 55 60

<210> 116
<211> 64
<212> PRT
<213> Centruroides elegans

<400> 116

Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys Tyr Thr Cys Trp
1 5 10 15

Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys Thr Trp Lys His
20 25 30

Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Ser Asn Lys Arg Cys
50 55 60

<210> 117

<211> 323

<212> DNA

<213> Centruroides elegans

<220>

<221> CDS

<222> (5) .. (265)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>

<221> 3'UTR

<222> (269) .. (323)

<223>

<220>

<221> 5'UTR

<222> (1) .. (4)

<223>

<220>

<221> mat_peptide

<222> (65) .. ()

<223> Product= Sodium-channel modifier toxin

<220>

<221> sig_peptide

<222> (5) .. (64)

<223>

<400> 117

gaag atg aat tcg ttg atg atc act gct tgt ttg gtc atg ttc gga
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Met Phe Gly
-20 -15 -10

49

aca gtg tgg gca aaa aaa gac ggt tat ctg gtg gac aag acg ggc tgc
Thr Val Trp Ala Lys Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys
-5 -1 1 5 10

97

aaa tac act tgc tgg ata ttg gga gaa aac aaa tac tgc aat agg gaa

145

Lys Tyr Thr Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu		
15	20	25
tgc aca tgg aag cac cga gga ggt aat tac ggc tat tgc tac gga ttt		193
Cys Thr Trp Lys His Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe		
30	35	40
ggg tgc tat tgc gaa gga ttg tcc gat agt aca ccg act tgg ccc ctt		241
Gly Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu		
45	50	55
cct aat aaa aga tgc ggc aaa aaa taatggcaac gacttttat tgtccaccaa		295
Pro Asn Lys Arg Cys Gly Lys Lys		
60	65	
cagaaatagt gtaacgcttc ttaattgc		323
<210> 118		
<211> 87		
<212> PRT		
<213> Centruroides elegans		
<400> 118		
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Met Phe Gly Thr		
-20	-15	-10
		-5
Val Trp Ala Lys Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys		
-1	1	5
		10
Tyr Thr Cys Trp Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys		
15	20	25
Thr Trp Lys His Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly		
30	35	40
Cys Tyr Cys Glu Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro		
45	50	55
		60
Asn Lys Arg Cys Gly Lys Lys		
65		
<210> 119		
<211> 192		
<212> DNA		
<213> Centruroides elegans		
<220>		
<221> CDS		
<222> (1) .. (192)		
<223> Product= Sodium-channel modifier toxin		
<400> 119		
aaa gac ggt tat ctg gtg gac aag acg ggc tgc aaa tac act tgc tgg		48

Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys Tyr Thr Cys Trp
1 5 10 15

ata ttg gga gaa aac aaa tac tgc aat agg gaa tgc aca tgg aag cac 96
Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys Thr Trp Lys His
20 25 30

cga gga ggt aat tac ggc tat tgc tac gga ttt ggg tgc tat tgc gaa 144
Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg tcc gat agt aca ccg act tgg ccc ctt cct aat aaa aga tgc 192
Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Arg Cys
50 55 60

<210> 120
<211> 64
<212> PRT
<213> Centruroides elegans

<400> 120

Lys Asp Gly Tyr Leu Val Asp Lys Thr Gly Cys Lys Tyr Thr Cys Trp
1 5 10 15

Ile Leu Gly Glu Asn Lys Tyr Cys Asn Arg Glu Cys Thr Trp Lys His
20 25 30

Arg Gly Gly Asn Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Ser Asp Ser Thr Pro Thr Trp Pro Leu Pro Asn Lys Arg Cys
50 55 60

<210> 121
<211> 323
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (5)..(265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 5'UTR
<222> (1)..(4)
<223>

<220>
<221> 3'UTR
<222> (269)..(323)
<223>

<220>
<221> mat_peptide
<222> (71)..()
<223> Product= Sodium-channel modifier toxin

<220>
<221> sig_peptide
<222> (5)..(70)
<223>

<400> 121
gaag atg aat tcg ttg ttg atg atc act gct tgt ttg gtc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-20 -15 -10

acc gtg tgg gca aag gac ggt tat ctg gtg aag aag agc gac ggc tgc 97
Thr Val Trp Ala Lys Asp Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
-5 -1 1 5

aaa tac ggt tgc atg ctc aag ata gga gac gct ggc tgt gat aag gaa 145
Lys Tyr Gly Cys Met Leu Lys Ile Gly Asp Ala Gly Cys Asp Lys Glu
10 15 20 25

tgc aaa gcg ccg aac caa gga ggt agt tac ggc tat tgc tac ctt ctt 193
Cys Lys Ala Pro Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu
30 35 40

ggg tgc tgg tgc gaa ggt atg cct gaa agt aca ccg act tat ccc ctt 241
Gly Cys Trp Cys Glu Gly Met Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55

cct ggt aaa tca tgc ggc aaa aaa taatggcaac gtcttttat tgtccactaa 295
Pro Gly Lys Ser Cys Gly Lys Lys
60 65

cagaaatatt gtaacgcttc ttaattgc 323

<210> 122
<211> 87
<212> PRT
<213> Centruroides gracilis

<400> 122
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
-20 -15 -10

Val Trp Ala Lys Asp Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys
-5 -1 1 5 10

Tyr Gly Cys Met Leu Lys Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Pro Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly
30 35 40

Cys Trp Cys Glu Gly Met Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
45 50 55

Gly Lys Ser Cys Gly Lys Lys
60 65

<210> 123
<211> 186
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1)...(186)
<223> Product= Sodium-channel modifier toxin

<400> 123
tat ctg gtg aag aag agc gac ggc tgc aaa tac ggt tgc atg ctc aag 48
Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Gly Cys Met Leu Lys
1 5 10 15

ata gga gac gct ggc tgt gat aag gaa tgc aaa gcg ccg aac caa gga 96
Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys Lys Ala Pro Asn Gln Gly
20 25 30

ggt agt tac ggc tat tgc tac ctt ctt ggg tgc tgg tgc gaa ggt atg 144
Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly Cys Trp Cys Glu Gly Met
35 40 45

cct gaa agt aca ccg act tat ccc ctt cct ggt aaa tca tgc 186
Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Gly Lys Ser Cys
50 55 60

<210> 124
<211> 62
<212> PRT
<213> Centruroides gracilis

<400> 124

Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Gly Cys Met Leu Lys
1 5 10 15

Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys Lys Ala Pro Asn Gln Gly
20 25 30

Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly Cys Trp Cys Glu Gly Met
35 40 45

Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Gly Lys Ser Cys
50 55 60

<210> 125
<211> 323

<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
<221> 5'UTR
<222> (1) .. (4)
<223>

<220>
<221> 3'UTR
<222> (269) .. (323)
<223>

<220>
<221> sig_peptide
<222> (5) .. (70)
<223>

<220>
<221> mat_peptide
<222> (71) .. ()
<223> Product= Sodium-channel modifier toxin

<400> 125
gaag atg aac tcg ttg atg atc act gct tgt ttg gtc ctg atc gga 49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-20 -15 -10

acc gtg tgg gca aag gac ggt tat ctg gtg aag gag agc gac ggc tgc 97
Thr Val Trp Ala Lys Asp Gly Tyr Leu Val Lys Glu Ser Asp Gly Cys
-5 -1 1 5

aaa tac ggt tgc atg ctc aag ata gga gac gct ggc tgt gat aag gaa 145
Lys Tyr Gly Cys Met Leu Lys Ile Gly Asp Ala Gly Cys Asp Lys Glu
10 15 20 25

tgc aaa gcg ccg aac caa gga ggt agt tac ggc tat tgc tac ctt ctt 193
Cys Lys Ala Pro Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu
30 35 40

ggg tgc tgg tgc gaa ggt atg cct gaa agt aca ccg act tat ccc ctt 241
Gly Cys Trp Cys Glu Gly Met Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55

cct ggt aaa tca tgc ggc aaa aaa taatggcaac gtcttttat tgtccactaa 295
Pro Gly Lys Ser Cys Gly Lys Lys
60 65

cagaaatatt gtaacgcttc ttaattgc 323

<210> 126
<211> 87

<212> PRT
<213> Centruroides gracilis

<400> 126

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
-20 -15 -10

Val Trp Ala Lys Asp Gly Tyr Leu Val Lys Glu Ser Asp Gly Cys Lys
-5 -1 1 5 10

Tyr Gly Cys Met Leu Lys Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Pro Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly
30 35 40

Cys Trp Cys Glu Gly Met Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
45 50 55

Gly Lys Ser Cys Gly Lys Lys
60 65

<210> 127
<211> 186
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1) .. (186)
<223> Product= Sodium-channel modifier toxin

<400> 127
tat ctg gtg aag gag agc gac ggc tgc aaa tac ggt tgc atg ctc aag 48
Tyr Leu Val Lys Glu Ser Asp Gly Cys Lys Tyr Gly Cys Met Leu Lys
1 5 10 15

ata gga gac gct ggc tgt gat aag gaa tgc aaa gcg ccg aac caa gga 96
Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys Lys Ala Pro Asn Gln Gly
20 25 30

ggt agt tac ggc tat tgc tac ctt ctt ggg tgc tgg tgc gaa ggt atg 144
Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly Cys Trp Cys Glu Gly Met
35 40 45

cct gaa agt aca ccg act tat ccc ctt cct ggt aaa tca tgc 186
Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Gly Lys Ser Cys
50 55 60

<210> 128
<211> 62
<212> PRT
<213> Centruroides gracilis

<400> 128

Tyr Leu Val Lys Glu Ser Asp Gly Cys Lys Tyr Gly Cys Met Leu Lys
1 5 10 15

Ile Gly Asp Ala Gly Cys Asp Lys Glu Cys Lys Ala Pro Asn Gln Gly
20 25 30

Gly Ser Tyr Gly Tyr Cys Tyr Leu Leu Gly Cys Trp Cys Glu Gly Met
35 40 45

Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Gly Lys Ser Cys
50 55 60

<210> 129

<211> 323

<212> DNA

<213> Centruroides gracilis

<220>

<221> CDS

<222> (5) .. (265)

<223> Product= Sodium-channel modifier toxin precursor

<220>

<221> 5'UTR

<222> (1) .. (4)

<223>

<220>

<221> 3'UTR

<222> (269) .. (323)

<223>

<220>

<221> mat_peptide

<222> (62) .. ()

<223> Product= Sodium-channel modifier toxin

<220>

<221> sig_peptide

<222> (5) .. (61)

<223>

<400> 129

gaag atg aat tcg ttg atg atc act gct tgt ttg gtc ctg atc gga
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-15 -10 -5

49

acg gtg tgg gca aag gac ggt tat ctg gtg aac aag agc acg ggc tgc
Thr Val Trp Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

97

aaa tac agt tgc ata gaa aat ata aac gac agt cac tgc aat gag gaa
Lys Tyr Ser Cys Ile Glu Asn Ile Asn Asp Ser His Cys Asn Glu Glu
15 20 25

145

tgt ata tcg tcg atc cgc aaa ggt agt tac ggc tat tgc tac aaa ttt
 Cys Ile Ser Ser Ile Arg Lys Gly Ser Tyr Gly Tyr Cys Tyr Lys Phe
 30 35 40 193

tac tgt tat tgc ata ggt atg ccc gat agt aca cag gtt tat cct att
 Tyr Cys Tyr Cys Ile Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Ile
 45 50 55 60 241

cct ggt aaa act tgc agc aca gaa taatggcaac gtcttttat tgtccaccaa
 Pro Gly Lys Thr Cys Ser Thr Glu
 65 295

cagaaatatt gtaacgcttc ttaattgc 323

<210> 130
 <211> 87
 <212> PRT
 <213> Centruroides gracilis

<400> 130

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
 -15 -10 -5

Val Trp Ala Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
 -1 1 5 10

Tyr Ser Cys Ile Glu Asn Ile Asn Asp Ser His Cys Asn Glu Glu Cys
 15 20 25

Ile Ser Ser Ile Arg Lys Gly Ser Tyr Gly Tyr Cys Tyr Lys Phe Tyr
 30 35 40 45

Cys Tyr Cys Ile Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Ile Pro
 50 55 60

Gly Lys Thr Cys Ser Thr Glu
 65

<210> 131
 <211> 204
 <212> DNA
 <213> Centruroides gracilis

<220>
 <221> CDS
 <222> (1) .. (204)
 <223> Product= Sodium-channel modifier toxin

<400> 131

aag gac ggt tat ctg gtg aac aag agc acg ggc tgc aaa tac agt tgc
 Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys
 1 5 10 15 48

ata gaa aat ata aac gac agt cac tgc aat gag gaa tgt ata tcg tcg	96
Ile Glu Asn Ile Asn Asp Ser His Cys Asn Glu Glu Cys Ile Ser Ser	
20 25 30	
atc cgc aaa ggt agt tac ggc tat tgc tac aaa ttt tac tgt tat tgc	144
Ile Arg Lys Gly Ser Tyr Gly Tyr Cys Tyr Lys Phe Tyr Cys Tyr Cys	
35 40 45	
ata ggt atg ccc gat agt aca cag gtt tat cct att cct ggt aaa act	192
Ile Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Ile Pro Gly Lys Thr	
50 55 60	
tgc agc aca gaa	204
Cys Ser Thr Glu	
65	
<210> 132	
<211> 68	
<212> PRT	
<213> Centruroides gracilis	
<400> 132	
Lys Asp Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Ser Cys	
1 5 10 15	
Ile Glu Asn Ile Asn Asp Ser His Cys Asn Glu Glu Cys Ile Ser Ser	
20 25 30	
Ile Arg Lys Gly Ser Tyr Gly Tyr Cys Tyr Lys Phe Tyr Cys Tyr Cys	
35 40 45	
Ile Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Ile Pro Gly Lys Thr	
50 55 60	
Cys Ser Thr Glu	
65	
<210> 133	
<211> 323	
<212> DNA	
<213> Centruroides gracilis	
<220>	
<221> CDS	
<222> (5) .. (265)	
<223> Product= Sodium-channel modifier toxin precursor	
In the mature peptide, the last Cys is amidated, and the last Gly	
and the last 2 basic aminoacids are cut	
<220>	
<221> 5'UTR	
<222> (1) .. (4)	
<223>	

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<220>
<221> 3'UTR
<222> (269)..(323)
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<223> Product= Sodium-channel modifier toxin

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<222> (5)..(70)
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<400> 133
gaag atg aac tcg ttg atg atc act gct tgt ttg gtc ctg atc gga      49
Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly
-20          -15          -10

acc gtg tgg aca aag gac ggt tat ctg gtg aag aag agc gac ggc tgc      97
Thr Val Trp Thr Lys Asp Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
-5          -1          1          5

aaa tac ggt tgc gta atg ttg gtc gga gac agt ggc tgc gat acg gaa      145
Lys Tyr Gly Cys Val Met Leu Val Gly Asp Ser Gly Cys Asp Thr Glu
10          15          20          25

tgc aaa gcg aag aat caa ggt ggt aaa aaa gga tgg tgc tac gcc ttt      193
Cys Lys Ala Lys Asn Gln Gly Gly Lys Lys Gly Trp Cys Tyr Ala Phe
30          35          40

ggg tgc tgg tgc aca ggt atg ccc gac agt aca cag gtt tat ccc ctt      241
Gly Cys Trp Cys Thr Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Leu
45          50          55

cct gat aaa tca tgc ggc aaa aaa taatggcaac gtcttttat tgtccaccaa      295
Pro Asp Lys Ser Cys Gly Lys Lys
60          65

cagaaatagt gtaacgcttc ttaattgc                                         323

<210> 134
<211> 87
<212> PRT
<213> Centruroides gracilis

<400> 134

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Ile Gly Thr
-20          -15          -10

Val Trp Thr Lys Asp Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys
-5          -1          1          5          10

Tyr Gly Cys Val Met Leu Val Gly Asp Ser Gly Cys Asp Thr Glu Cys
15          20          25
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Lys Ala Lys Asn Gln Gly Gly Lys Lys Gly Trp Cys Tyr Ala Phe Gly
30 35 40

Cys Trp Cys Thr Gly Met Pro Asp Ser Thr Gln Val Tyr Pro Leu Pro
45 50 55

Asp Lys Ser Cys Gly Lys Lys
60 65

<210> 135

<211> 186

<212> DNA

<213> Centruroides gracilis

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<222> (1)...(186)

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<400> 135
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Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Gly Cys Val Met Leu
1 5 10 15

gtc gga gac agt ggc tgc gat acg gaa tgc aaa gcg aag aat caa ggt 96
Val Gly Asp Ser Gly Cys Asp Thr Glu Cys Lys Ala Lys Asn Gln Gly
20 25 30

ggt aaa aaa gga tgg tgc tac gcc ttt ggg tgc tgg tgc aca ggt atg 144
Gly Lys Lys Gly Trp Cys Tyr Ala Phe Gly Cys Trp Cys Thr Gly Met
35 40 45

ccc gac agt aca cag gtt tat ccc ctt cct gat aaa tca tgc 186
Pro Asp Ser Thr Gln Val Tyr Pro Leu Pro Asp Lys Ser Cys
50 55 60

<210> 136

<211> 62

<212> PRT

<213> Centruroides gracilis

<400> 136

Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Gly Cys Val Met Leu
1 5 10 15

Val Gly Asp Ser Gly Cys Asp Thr Glu Cys Lys Ala Lys Asn Gln Gly
20 25 30

Gly Lys Lys Gly Trp Cys Tyr Ala Phe Gly Cys Trp Cys Thr Gly Met
35 40 45

Pro Asp Ser Thr Gln Val Tyr Pro Leu Pro Asp Lys Ser Cys
50 55 60

<210> 137
<211> 323
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<213> *Centruroides sculpturatus*

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In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion *Centruroides sculpturatus* Ewing,
that recognize Na⁺-channels
<303> Toxicon
<304> 39
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<306> 1893-1898
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<309>
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<400> 137
gaag atg aat tcg ttg ttg atc atc act gtt tgt ttg ttc ctg atc gga 49
Met Asn Ser Leu Leu Ile Ile Thr Val Cys Leu Phe Leu Ile Gly
-15 -10 -5

acc gtg tgg gca aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac gat tgc ttt tgg ttg gga aaa aac gaa cac tgc gat ttg gaa 145
Lys Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe

	30	35	40	
gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt				241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu				
45	50	55	60	
cct aat aaa tca tgc ggc aaa aaa taatagcaac aacttttat tgtccaccaa				295
Pro Asn Lys Ser Cys Gly Lys Lys				
65				
cagaaatatt gtaacgcttc ttaattgc				323
<210>	138			
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<212>	PRT			
<213>	Centruroides sculpturatus			
<400>	138			
Met Asn Ser Leu Leu Ile Ile Thr Val Cys Leu Phe Leu Ile Gly Thr				
-15		-10		-5
Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys				
-1 1	5		10	
Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys				
15	20	25		
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala				
30	35	40	45	
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro				
50	55	60		
Asn Lys Ser Cys Gly Lys Lys				
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Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Asp Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa cac tgc gat ttg gaa tgc aaa gcg aag 96
Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc
Cys 195
65

<210> 140
<211> 65
<212> PRT
<213> *Centruroides sculpturatus*

<400> 140
Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Asp Cys
1 5 10 15

Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys
65

<210> 141
<211> 323
<212> DNA
<213> *Centruroides sculpturatus*

<220>
<221> CDS
<222> (5)..(265)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

<220>
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that recognize Na⁺-channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
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Met Asn Ser Leu Leu Met Ile Thr Ala Cys Phe Ala Leu Val Gly
-15 -10 -5

aca gtg tgg gca aag gaa ggt tat ctg gtg aag aag agc gat ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
-1 1 5 10

aaa tac gat tgc ttt tgg ttg gga aaa aac gaa cac tgc gat ttg gaa 145
Lys Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tca tgc ggc aaa aaa taatagcaac aacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Gly Lys Lys
65

cagaaatagt gtaacgcttc ttaattgc 323

<210> 142
<211> 87
<212> PRT
<213> Centruroides sculpturatus

<400> 142

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Phe Ala Leu Val Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys
-1 1 5 10

Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Gly Lys Lys
65

<210> 143
<211> 195
<212> DNA
<213> Centruroides sculpturatus

<220>
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<222> (1)..(195)
<223> Product= Sodium-channel modifier toxin

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that recognize Na⁺-channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
<313> (1)..(195)

<400> 143

aag gaa ggt tat ctg gtg aag aag agc gat ggc tgc aaa tac gat tgc
Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Asp Cys
1 5 10 15

ttt tgg ttg gga aaa aac gaa cac tgc gat ttg gaa tgc aaa gcg aag Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys Lys Ala Lys 20 25 30	96
aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys 35 40 45	144
gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser 50 55 60	192
tgc Cys 65	195
<210> 144 <211> 65 <212> PRT <213> Centruroides sculpturatus	
<400> 144	
Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys Lys Tyr Asp Cys 1 5 10 15	
Phe Trp Leu Gly Lys Asn Glu His Cys Asp Leu Glu Cys Lys Ala Lys 20 25 30	
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys 35 40 45	
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser 50 55 60	
Cys 65	
<210> 145 <211> 323 <212> DNA <213> Centruroides sculpturatus	
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<220> <221> 3'UTR <222> (269) .. (323) <223>	

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<220>
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<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na+-channels
<303> Toxicon
<304> 39
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<309>
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gaag atg aac tcg ttg ttg atg atc act gct tgt ttg ttc ctg atc gga 49
    Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Phe Leu Ile Gly
    -15                  -10                  -5

acc gtg tgg gca aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
    -1    1                  5                  10

aaa tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
    15                  20                  25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
    30                  35                  40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
    45                  50                  55                  60

cct aat aaa tca tgc ggc aaa aaa taatagcaac aacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Gly Lys Lys
    65

cagaaaatatt gtaacgcttc ttaattgc 323

<210> 146
<211> 87
<212> PRT
<213> Centruroides sculpturatus

<400> 146

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Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Phe Leu Ile Gly Thr
-15 -10 -5

Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Gly Lys Lys
65

<210> 147
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<212> DNA
<213> Centruroides sculpturatus

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<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na⁺-channels

<303> Toxicon
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<307> 2001-12-01
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<400> 147
aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa tac ggt tgc 48
Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa tgc aaa gcg aag 96
Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser

50

55

60

195

tgc
Cys
65

<210> 148
<211> 65
<212> PRT
<213> Centruroides sculpturatus

<400> 148

Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys
65

<210> 149
<211> 320
<212> DNA
<213> Centruroides sculpturatus

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In the mature peptide, the last Cys is amidated, and the last Gly
and the last 2 basic aminoacids are cut

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<304> 39
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<306> 1893-1898
<307> 2001-12-01
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<313> (5)..(262)

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gaag atg aat tcg ttg ttg atg att act gct tgt ttg gtc ctg atc gga 49
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-15 -10 -5

aca gtg tgg gca aag gac ggt tat cta gtg gaa aag acg ggc tgc aaa 97
Thr Val Trp Ala Lys Asp Gly Tyr Leu Val Glu Lys Thr Gly Cys Lys
-1 1 5 10

aag act tgc tac aaa ttg gga gaa aac gat ttt tgc aat agg gaa tgc 145
Lys Thr Cys Tyr Lys Leu Gly Glu Asn Asp Phe Cys Asn Arg Glu Cys
15 20 25

aaa tgg aag cac ata gga ggt agt tat ggc tat ttc tac gga ttt ggg 193
Lys Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Phe Tyr Gly Phe Gly
30 35 40

tgc tat tgc gaa gga ttg ccc gat agt aca cag act tgg ccc ctt cct 241
Cys Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro
45 50 55 60

aat aaa aca tgc ggc aaa aaa taatggcaac gacttttat tgttcaccaa 292
Asn Lys Thr Cys Gly Lys Lys
65

aagaaaatagt gtaacgcttc ttaatttc 320

<210> 150
<211> 86
<212> PRT
<213> Centruroides sculpturatus

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-15 -10 -5

Val Trp Ala Lys Asp Gly Tyr Leu Val Glu Lys Thr Gly Cys Lys Lys
-1 1 5 10

Thr Cys Tyr Lys Leu Gly Glu Asn Asp Phe Cys Asn Arg Glu Cys Lys
15 20 25

Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Phe Tyr Gly Phe Gly Cys
30 35 40 45

Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn
50 55 60

Lys Thr Cys Gly Lys Lys
65

<210> 151
<211> 192
<212> DNA
<213> Centruroides sculpturatus

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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
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<304> 39
<305> 12
<306> 1893-1898
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1 5 10 15

aaa ttg gga gaa aac gat ttt tgc aat agg gaa tgc aaa tgg aag cac 96
Lys Leu Gly Glu Asn Asp Phe Cys Asn Arg Glu Cys Lys Trp Lys His
20 25 30

ata gga ggt agt tat ggc tat ttc tac gga ttt ggg tgc tat tgc gaa 144
Ile Gly Gly Ser Tyr Gly Tyr Phe Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg ccc gat agt aca cag act tgg ccc ctt cct aat aaa aca tgc 192
Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
50 55 60

<210> 152
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<213> Centruroides sculpturatus

<400> 152

Lys Asp Gly Tyr Leu Val Glu Lys Thr Gly Cys Lys Lys Thr Cys Tyr

1

5

10

15

Lys Leu Gly Glu Asn Asp Phe Cys Asn Arg Glu Cys Lys Trp Lys His
20 25 30

Ile Gly Gly Ser Tyr Gly Tyr Phe Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
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<222> (1)..(261)

<223> Product= Sodium-channel modifier toxin precursor
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that recognize Na⁺-channels

<303> Toxicon

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<306> 1893-1898

<307> 2001-12-01

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-15 -10 -5

48

gtg tgg gca aaa gaa ggt tat ctg gta aac aag agc acg ggc tgc aaa
Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys
-1 1 5 10

96

tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa tgc Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys 15 20 25	144
aaa gcg gag aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca Lys Ala Glu Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala 30 35 40 45	192
tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt ccc Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro 50 55 60	240
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cagaaatatt gtaacgcttc ttaattgc	319
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Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys 15 20 25	
Lys Ala Glu Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala 30 35 40 45	
Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro 50 55 60	
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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na+-channels

<303> Toxicon

<304> 39

<305> 12

<306> 1893-1898

<307> 2001-12-01

<309>

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ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa tgc aaa gcg gag 96
Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Glu
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt ccc aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc agc 198
Cys Ser
65

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<213> Centruroides sculpturatus

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20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys Ser
65

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In the mature peptide, the last 2 basic aminoacids are cut

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Thr Val Trp Ala Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu

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Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys								
15 20 25								
Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala								
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1 5 10 15

ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa tgc aaa gcg aag 96
Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt cct aat aaa tca 192
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50 55 60

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Cys Ser
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<213> Centruroides sculpturatus

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Arg Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
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Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
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Cys Ser
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acc gtg tgg gca aaa gaa ggt tat ctg gta aac aag agc acg gcc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Ala Cys
      -1      1           5           10
aaa tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
      15           20           25
tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
      30           35           40
gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
      45           50           55           60
cct aat aaa tca tgc agc aga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Ser Arg Lys
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cagaaatatt gtaacgcttc ttaattga 323

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<212> PRT
<213> Centruroides sculpturatus

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-1 1 5 10

Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala
30 35 40 45

Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
50 55 60

Asn Lys Ser Cys Ser Arg Lys
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Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Ala Cys Lys Tyr Gly Cys
1 5 10 15

ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa tgc aaa gcg aag 96
Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

tgc agc 198
Cys Ser
65

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20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
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Cys Ser
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In the mature peptide, the last Cys is amidated, and the last Gly
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aca gtg tgg gca aag gaa ggt tat ctg gtg aag aag agc gat ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
-1 1 5 10

aaa tac gat tgc ttt tgg ttg gga aaa aac gaa cac tgc gat acg gaa 145
Lys Tyr Asp Cys Phe Trp Leu Gly Lys Asn Glu His Cys Asp Thr Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tca tgc ggc aaa aaa taatagcaac aacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Gly Lys Lys
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<213> Centruroides sculpturatus

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-1 1 5 10

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15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala
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50 55 60

Asn Lys Ser Cys Gly Lys Lys
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Phe Trp Leu Gly Lys Asn Glu His Cys Asp Thr Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca 192
Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

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Cys 195

65

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<212> PRT
<213> Centruroides sculpturatus

<400> 168

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Phe Trp Leu Gly Lys Asn Glu His Cys Asp Thr Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys
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and the last 2 basic aminoacids are cut

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aca gtg tgg gca aag gaa ggt tat ctg gtg aag aag agc gat ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Lys Lys Ser Asp Gly Cys
-1 1 5 10

aaa tac gat tgc ttt tgg ttg gga gaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Asp Cys Phe Trp Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggg tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tca tgc ggc aaa aaa taatagcaac aacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Gly Lys Lys
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cagaaaatagt gtaacgcttc ttaattgc 323

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<213> Centruroides sculpturatus

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-1 1 5 10

Tyr Asp Cys Phe Trp Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala

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Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro
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Phe Trp Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

96

aac caa gga ggt agt tac ggg tat tgc tac gct ttc gca tgc tgg tgc
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

144

gaa ggt ttg ccc gaa agt aca ccg act tat ccc ctt cct aat aaa tca
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192

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Cys

65

195

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20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys
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Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys
-1 1 5 10

aaa tac ggt tgc ctg aaa ttg gga gaa aac gaa ggc tgc gat aag gaa 145
Lys Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu
15 20 25

tgc aaa gcg aag aac caa gga ggt agt tac ggc tat tgc tac gct ttc 193
Cys Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe
30 35 40

gca tgc tgg tgc gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt 241
Ala Cys Trp Cys Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu
45 50 55 60

cct aat aaa tca tgc agc aga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Asn Lys Ser Cys Ser Arg Lys
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cagaaatagt gtaacgcttc ttaattgc 323

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-1 1 5 10

Tyr Gly Cys Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys
15 20 25

Lys Ala Lys Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala
30 35 40 45

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50 55 60

Asn Lys Ser Cys Ser Arg Lys
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Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

aac caa gga ggt agt tac ggc tat tgc tac gct ttc gca tgc tgg tgc 144
Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

gaa ggt ttg ccc gaa agt aca ccg act tat cct ctt cct aat aaa tca 192
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50 55 60

tgc agc 198
Cys Ser
65

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<213> Centruroides sculpturatus

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Lys Glu Gly Tyr Leu Val Asn Lys Ser Thr Gly Cys Lys Tyr Gly Cys
1 5 10 15

Leu Lys Leu Gly Glu Asn Glu Gly Cys Asp Lys Glu Cys Lys Ala Lys
20 25 30

Asn Gln Gly Gly Ser Tyr Gly Tyr Cys Tyr Ala Phe Ala Cys Trp Cys
35 40 45

Glu Gly Leu Pro Glu Ser Thr Pro Thr Tyr Pro Leu Pro Asn Lys Ser
50 55 60

Cys Ser
65

<210> 177
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<223> Product= Sodium-channel modifier toxin

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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na⁺-channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
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<400> 177
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-15 -10 -5

act gtg ttg gca gag gat ggt tat ttg ttt gac aag aga aag cgc tgc 97
Thr Val Leu Ala Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys
-1 1 5 10

aca ctc gaa tgc ata gac aag aca gga gac aaa aat tgc gat agg aat	145
Thr Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn	
15 20 25	
tgc aag aat gaa gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc	193
Cys Lys Asn Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys	
30 35 40	
tgg tgc aaa gga ttg ccc gga att aca ccg att tca cgt act cct ggt	241
Trp Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly	
45 50 55 60	
aaa aca tgt aaa ata taatggcaac ttttttatt gtgcaccaac agaaatagtg	296
Lys Thr Cys Lys Ile	
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taacgcttct taattgc	313
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<400> 178	
Met Asn Ser Leu Leu Met Ile Thr Thr Cys Leu Ile Leu Ile Gly Thr	
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Leu Glu Cys Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys	
15 20 25	
Lys Asn Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp	
30 35 40 45	
Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys	
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Thr Cys Lys Ile	
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ata gac aag aca gga gac aaa aat tgc gat agg aat tgc aag aat gaa 96
Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Asn Glu
20 25 30

gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc tgg tgc aaa gga 144
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly
35 40 45

ttg ccc gga att aca ccg att tca cgt act cct ggt aaa aca tgt aaa 192
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys
50 55 60

ata 195
Ile
65

<210> 180
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<213> Centruroides sculpturatus

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Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr Leu Glu Cys
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Ile Asp Lys Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Asn Glu
20 25 30

Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly
35 40 45

Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys
50 55 60

Ile
65

<210> 181
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<212> DNA
<213> Centruroides sculpturatus

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<223> Product= Sodium-channel modifier toxin precursor

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<303> Toxicon
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Met Asn Ser Leu Leu Ile Ile Thr Thr Cys Leu Ile Leu Ile Gly
-15 -10 -5

act gtg ttg gca gag gat ggt tat ttg ttt gac aag aga aag cgc tgc 97
Thr Val Leu Ala Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys
-1 1 5 10

aca ctc gaa tgc ata gac atg aca gga gac aaa aat tgc gat agg aat 145
Thr Leu Glu Cys Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn
15 20 25

tgc aag aag gaa gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc 193
Cys Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys
30 35 40

tgg tgc aaa gga ttg ccc gga att aca ccg att tca cgt act cct ggt 241
Trp Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly
45 50 55 60

aaa aca tgt aaa ata taatggcaac ttttttatt gtgcaccaac agaaatattg	296		
Lys Thr Cys Lys Ile			
65			
taacgcttct taatttc	313		
<210> 182			
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<212> PRT			
<213> Centruroides sculpturatus			
<400> 182			
Met Asn Ser Leu Leu Ile Ile Thr Thr Cys Leu Ile Leu Ile Gly Thr			
-15	-10	-5	
Val Leu Ala Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr			
-1 1	5	10	
Leu Glu Cys Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys			
15	20	25	
Lys Lys Glu Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp			
30	35	40	45
Cys Lys Gly Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys			
50	55	60	
Thr Cys Lys Ile			
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<210> 183			
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that recognize Na ⁺ -channels			
<303> Toxicon			
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<307> 2001-12-01			
<309>			
<313> (1)..(195)			
<400> 183			

gag gat ggt tat ttg ttt gac aag aga aag cgc tgc aca ctc gaa tgc	48
Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr Leu Glu Cys	
1 5 10 15	
ata gac atg aca gga gac aaa aat tgc gat agg aat tgc aag aag gaa	96
Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Lys Glu	
20 25 30	
gga ggt agt ttt ggc aaa tgc tcc tat ttt gca tgc tgg tgc aaa gga	144
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly	
35 40 45	
ttg ccc gga att aca ccg att tca cgt act cct ggt aaa aca tgt aaa	192
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys	
50 55 60	
ata	195
Ile	
65	
<210> 184	
<211> 65	
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<213> Centruroides sculpturatus	
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Glu Asp Gly Tyr Leu Phe Asp Lys Arg Lys Arg Cys Thr Leu Glu Cys	
1 5 10 15	
Ile Asp Met Thr Gly Asp Lys Asn Cys Asp Arg Asn Cys Lys Lys Glu	
20 25 30	
Gly Gly Ser Phe Gly Lys Cys Ser Tyr Phe Ala Cys Trp Cys Lys Gly	
35 40 45	
Leu Pro Gly Ile Thr Pro Ile Ser Arg Thr Pro Gly Lys Thr Cys Lys	
50 55 60	
Ile	
65	
<210> 185	
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<223> Product= Sodium-channel modifier toxin precursor	
In the mature peptide, the last Cys is amidated, and the last Gly	
and the last 2 basic aminoacids are cut	
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<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
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<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
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  Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
    -15           -10           -5

gtc tgg tca gag aaa ggt tat ctg gtg cat gag gac acg ggc tgc aga 97
  Val Trp Ser Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg
    -1   1           5           10

tac aag tgc act ttt tcg gga gaa aat agt tac tgc gat aag gaa tgc 145
  Tyr Lys Cys Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys
    15          20          25

aag agc caa gga ggt gat tct ggc att tgc caa tct aag gcg tgt tat 193
  Lys Ser Gln Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr
    30          35          40          45

tgc caa ggt ttg ccc gaa gat aca aag act tgg ccc ctt att ggt aaa 241
  Cys Gln Gly Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys
    50          55          60

tta tgc ggc aga aaa taatggcttc gtcttttat tgttcaccaa caaaaaatag 296
  Leu Cys Gly Arg Lys
    65

gtaacgcttc ttaatttc 314

<210> 186
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<212> PRT
<213> Centruroides sculpturatus

<400> 186

Met Asn Ser Leu Leu Met Ile Thr Ala Cys Leu Val Leu Phe Gly Thr
-15 -10 -5

Val Trp Ser Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg
-1 1 5 10

Tyr Lys Cys Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys
15 20 25

Lys Ser Gln Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr
30 35 40 45

Cys Gln Gly Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys
50 55 60

Leu Cys Gly Arg Lys
65

<210> 187
<211> 189
<212> DNA
<213> Centruroides sculpturatus

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<223> Product= Sodium-channel modifier toxin

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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus
Ewing, that recognize Na⁺-channels
<303> Toxicon
<304> 39
<305> 12
<306> 1893-1898
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Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg Tyr Lys Cys
1 5 10 15

act ttt tcg gga gaa aat agt tac tgc gat aag gaa tgc aag agc caa 96
Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys Lys Ser Gln
20 25 30

gga ggt gat tct ggc att tgc caa tct aag gcg tgt tat tgc caa ggt 144

Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr Cys Gln Gly
35 40 45

ttg ccc gaa gat aca aag act tgg ccc ctt att ggt aaa tta tgc 189
Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys Leu Cys
50 55 60

<210> 188
<211> 63
<212> PRT
<213> Centruroides sculpturatus

<400> 188

Glu Lys Gly Tyr Leu Val His Glu Asp Thr Gly Cys Arg Tyr Lys Cys
1 5 10 15

Thr Phe Ser Gly Glu Asn Ser Tyr Cys Asp Lys Glu Cys Lys Ser Gln
20 25 30

Gly Gly Asp Ser Gly Ile Cys Gln Ser Lys Ala Cys Tyr Cys Gln Gly
35 40 45

Leu Pro Glu Asp Thr Lys Thr Trp Pro Leu Ile Gly Lys Leu Cys
50 55 60

<210> 189
<211> 321
<212> DNA
<213> Centruroides sculpturatus

<220>
<221> CDS
<222> (5) .. (265)
<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Asn is amidated, and the last Gly
and the last basic aminoacid are cut

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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.
<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na⁺-channels
<303> Toxicon
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-15 -10 -5

aca gtc tgg gca aag gaa ggt tat att gtg aac tat cac acg ggc tgc 97
Thr Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys
-1 1 5 10

aaa tac gaa tgc ttt aaa ttg gga gac aac gat tat tgc ctg agg gaa 145
Lys Tyr Glu Cys Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu
15 20 25

tgc aaa ttg aga cac gga aaa ggt agt ggc ggc tat tgc tac gct ttt 193
Cys Lys Leu Arg His Gly Lys Ser Gly Gly Tyr Cys Tyr Ala Phe
30 35 40

ggg tgc tgg tgc aca cac ttg tac gaa caa gca gtg gtt tgg ccc ctt 241
Gly Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu
45 50 55 60

cct aag aaa aaa tgc aac gga aaa taatggcaac gacttttat tgtccaccaa 295
Pro Lys Lys Cys Asn Gly Lys
65

cagaaaatagt gtaacgcttc ttaatt 321

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<213> Centruroides sculpturatus

<400> 190
Met Asn Ser Leu Leu Ile Ile Ala Ala Cys Leu Ala Leu Ile Gly Thr
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Val Trp Ala Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys
-1 1 5 10

Tyr Glu Cys Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys
15 20 25

Lys Leu Arg His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly
30 35 40 45

Cys Trp Cys Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro
50 55 60

Lys Lys Lys Cys Asn Gly Lys
65

<210> 191
<211> 198
<212> DNA
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<304> 39
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Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys Tyr Glu Cys
1 5 10 15

ttt aaa ttg gga gac aac gat tat tgc ctg agg gaa tgc aaa ttg aga 96
Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg
20 25 30

cac gga aaa ggt agt ggc ggc tat tgc tac gct ttt ggg tgc tgg tgc 144
His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

aca cac ttg tac gaa caa gca gtg gtt tgg ccc ctt cct aag aaa aaa 192
Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Lys
50 55 60

tgc aac 198
Cys Asn
65

<210> 192
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<213> Centruroides sculpturatus

<400> 192

Lys Glu Gly Tyr Ile Val Asn Tyr His Thr Gly Cys Lys Tyr Glu Cys
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Phe Lys Leu Gly Asp Asn Asp Tyr Cys Leu Arg Glu Cys Lys Leu Arg
20 25 30

His Gly Lys Gly Ser Gly Gly Tyr Cys Tyr Ala Phe Gly Cys Trp Cys
35 40 45

Thr His Leu Tyr Glu Gln Ala Val Val Trp Pro Leu Pro Lys Lys Lys
50 55 60

Cys Asn
65

<210> 193

<211> 320

<212> DNA

<213> Centruroides sculpturatus

<220>

<221> CDS

<222> (5)..(262)

<223> Product= Sodium-channel modifier toxin precursor
In the mature peptide, the last Cys is amidated, and the last Gly
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<301> Corona, M., Valdez-Cruz, N.A., Merino, E., Zurita, M. & Possani L.D.

<302> Genes and peptides from the scorpion Centruroides sculpturatus Ewing,
that recognize Na⁺-channels

<303> Toxicon

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-15 -10 -5
aca gtg tgg gca aag gaa ggt tat ctg gtg gac gta aag ggc tgc aaa 97
Thr Val Trp Ala Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys
-1 1 5 10
aaa aat tgc tgg aaa ttg gga gat aac gat tat tgc aat agg gaa tgt 145
Lys Asn Cys Trp Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys
15 20 25
aaa tgg aag cac ata gga ggt agt tac ggc tat tgc tac gga ttt ggg 193
Lys Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly
30 35 40
tgc tat tgc gaa gga ttg ccc gat agt aca cag act tgg ccc ctt cct 241
Cys Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro
45 50 55 60
aat aaa aca tgc ggc aaa aaa taatggcaac gacttttat tgtctaccaa 292
Asn Lys Thr Cys Gly Lys Lys
65
cagaaatagt gtaacgcttc ttaattgc 320

<210> 194
<211> 86
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<213> Centruroides sculpturatus

<400> 194
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-15 -10 -5
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-1 1 5 10
Asn Cys Trp Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys
15 20 25
Trp Lys His Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys
30 35 40 45
Tyr Cys Glu Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn
50 55 60
Lys Thr Cys Gly Lys Lys

<210> 195
<211> 192
<212> DNA
<213> Centruroides sculpturatus

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<223> Product= Sodium-channel modifier toxin

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<304> 39
<305> 12
<306> 1893-1898
<307> 2001-12-01
<309>
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1 5 10 15

aaa ttg gga gat aac gat tat tgc aat agg gaa tgt aaa tgg aag cac 96
Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys Trp Lys His
20 25 30

ata gga ggt agt tac ggc tat tgc tac gga ttt ggg tgc tat tgc gaa 144
Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

gga ttg ccc gat agt aca cag act tgg ccc ctt cct aat aaa aca tgc 192
Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
50 55 60

<210> 196
<211> 64
<212> PRT
<213> Centruroides sculpturatus

<400> 196
Lys Glu Gly Tyr Leu Val Asp Val Lys Gly Cys Lys Lys Asn Cys Trp
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Lys Leu Gly Asp Asn Asp Tyr Cys Asn Arg Glu Cys Lys Trp Lys His
20 25 30

Ile Gly Gly Ser Tyr Gly Tyr Cys Tyr Gly Phe Gly Cys Tyr Cys Glu
35 40 45

Gly Leu Pro Asp Ser Thr Gln Thr Trp Pro Leu Pro Asn Lys Thr Cys
50 55 60

<210> 197
<211> 190
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1) .. (129)
<223> Product= Erg-channel modifier toxin precursor

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<221> 3'UTR
<222> (130) .. (190)
<223>

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Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgt aag aaa gct gga cac agt gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Ser Gly Gly
20 25 30

acc tgt atg ttt ttc aag tgt aaa tgt gcg taa actcgaaaat cagttataaa 149
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

tatcaaagtt gtaagctatt tatgaagtga aaaataaaaga t 190

<210> 198
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<212> PRT
<213> Centruroides exilicauda

<400> 198

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Ser Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 199
<211> 126
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS

<222> (1)..(126)
<223> Product= Erg-channel modifier toxin

<400> 199
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgt aag aaa gct gga cac agt gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Ser Gly Gly
20 25 30

acc tgt atg ttt ttc aag tgt aaa tgt gcg 126
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 200
<211> 42
<212> PRT
<213> Centruroides exilicauda

<400> 200
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Ser Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 201
<211> 197
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133)..(197)
<223>

<400> 201
gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

atc tgc gag tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taaaaagtga aaaataaaga ttatt 197

<210> 202
<211> 43
<212> PRT
<213> Centruroides exilicauda

<400> 202

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 203
<211> 129
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 203

gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

atc tgc gag tat tac aag tgt aaa tgt aac cca
Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro 129
35 40

<210> 204
<211> 43
<212> PRT
<213> Centruroides exilicauda

<400> 204

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Ile Cys Glu Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 205
<211> 196
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1) .. (132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133) .. (196)
<223>

<400> 205
gat aga gat agc tgt gtt gat aaa tca aaa tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gag tat ttc aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaaga ttat

196

<210> 206
<211> 43
<212> PRT
<213> Centruroides exilicauda

<400> 206

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 207
<211> 129
<212> DNA

<213> Centruroides exilicauda

<220>

<221> CDS

<222> (1) .. (129)

<223> Product= Erg-channel modifier toxin

<400> 207

gat aga gat agc tgt gtt gat aaa tca aaa tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gag tat ttc aag tgt aaa tgt aac cca 129
Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 208

<211> 43

<212> PRT

<213> Centruroides exilicauda

<400> 208

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr 1 5 10 15

Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30

Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 209

<211> 196

<212> DNA

<213> Centruroides exilicauda

<220>

<221> CDS

<222> (1) .. (132)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (133) .. (196)

<223>

<400> 209

gat aga gat agc tgt gtt gat aaa tca caa tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
 Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
 20 25 30

acc tgc gag tat ttc aag tgt aaa tgt aac cca taa actcgaatgt 142
 Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
 35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttag 196

<210> 210
<211> 43
<212> PRT
<213> Centruroides exilicauda

<400> 210

Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
 1 5 10 15

Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
 20 25 30

Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
 35 40

<210> 211
<211> 129
<212> DNA
<213> Centruroides exilicauda

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 211
 gat aga gat agc tgt gtt gat aaa tca caa tgc gca aaa tat gga tac 48
 Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
 1 5 10 15

tac tat caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
 Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
 20 25 30

acc tgc gag tat ttc aag tgt aaa tgt aac cca 129
 Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
 35 40

<210> 212
<211> 43
<212> PRT
<213> Centruroides exilicauda

<400> 212

Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Tyr Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Glu Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 213

<211> 202

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (1) .. (129)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (130) .. (202)

<223>

<400> 213

gat aga gat agc tgt gtt gat aaa tca cga tgc tca aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr
1 5 10 15

48

tac caa gag tgt cag gat tgt tgc aag aaa gct gga cac aat gga gga
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

96

acc tgc atg ttt ttc aag tgt aaa tgt gcg taa actcgaaat gaattaacaa
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

149

tatcaaagct gtaatctatt tatgaagtaa aaaataaaat ttttggaaatt tcc

202

<210> 214

<211> 42

<212> PRT

<213> Centruroides limpidus limpidus

<400> 214

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 215
<211> 126
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)...(126)
<223> Product= Erg-channel modifier toxin

<400> 215
gat aga gat agc tgt gtt gat aaa tca cga tgc tca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgc aag aaa gct gga cac aat gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

acc tgc atg ttt ttc aag tgt aaa tgt gcg 126
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 216
<211> 42
<212> PRT
<213> Centruroides limpidus limpidus

<400> 216
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 217
<211> 207
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)...(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133)...(207)
<223>

<400> 217
gat aga gat agc tgt gtt gat aaa tca aaa tgt tca aaa tat gga tac 48

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat ttc aag tgt aaa tgt aac cca taa actcgaatgt 142
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctatt taagaagtga aaaataaaga ttattaaatt 202

tccgc 207

<210> 218
<211> 43
<212> PRT
<213> Centruroides limpidus limpidus

<400> 218

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 219
<211> 129
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 219 48
gat aga gat agc tgt gtt gat aaa tca aaa tgt tca aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat ttc aag tgt aaa tgt aac cca 129
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 220
<211> 43

<212> PRT

<213> Centruroides limpidus limpidus

<400> 220

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Pro
35 40

<210> 221

<211> 209

<212> DNA

<213> Centruroides limpidus limpidus

<220>

<221> CDS

<222> (1)..(132)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (133)..(209)

<223> Product= Erg-channel modifier toxin

<400> 221

gat agg gat agc tgc gtt gac aaa tca aaa tgt tca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

tat ggt caa tgt gat aag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Lys Cys Cys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat ttc aag tgt aaa tgt aac caa taa actcgaatgt 142
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
35 40

gaacttaaga atatcaaagc tggaagctta tttaagaagt gaaaaataaa gattattaaa 202

taagaga 209

<210> 222

<211> 43

<212> PRT

<213> Centruroides limpidus limpidus

<400> 222

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
35 40

<210> 223
<211> 129
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 223
gat agg gat agc tgc gtt gac aaa tca aaa tgt tca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

tat ggt caa tgt gat aag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat ttc aag tgt aaa tgt aac caa 129
Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
35 40

<210> 224
<211> 43
<212> PRT
<213> Centruroides limpidus limpidus

<400> 224
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ser Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Lys Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Phe Lys Cys Lys Cys Asn Gln
35 40

<210> 225
<211> 141
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (1)..(132)
<223>

<400> 225
gat agg gat agc tgc gtt gac aaa tca aaa tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tat ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat tta aag tgt aaa tgt aac caa taa actcgaatg 141
Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
35 40

<210> 226
<211> 43
<212> PRT
<213> Centruroides limpidus limpidus

<400> 226
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
35 40

<210> 227
<211> 129
<212> DNA
<213> Centruroides limpidus limpidus

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 227
gat agg gat agc tgc gtt gac aaa tca aaa tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tat ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat tta aag tgt aaa tgt aac caa 129
Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
35 40

<210> 228

<211> 43

<212> PRT

<213> Centruroides limpidus limpidus

<400> 228

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Leu Lys Cys Lys Cys Asn Gln
35 40

<210> 229

<211> 244

<212> DNA

<213> Centruroides noxius

<220>

<221> CDS

<222> (1)...(132)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (133)...(244)

<223>

<400> 229

gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataagat tattaaattt 202

ccgcacaaac caacccaaaaa aaagtatcga tcgtatcgta tc 244

<210> 230

<211> 43

<212> PRT

<213> Centruroides noxius

<400> 230

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 231
<211> 129
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 231
gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca 129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 232
<211> 43
<212> PRT
<213> Centruroides noxius

<400> 232

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 233
<211> 212
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133) .. (212)
<223>

<400> 233
gat aga gat agc tgt gtt gat aaa tca caa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gaa cgt gta gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Ala Gly Glu Arg Val Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaaga ttattaaatt 202

tccgcaaatt 212

<210> 234
<211> 43
<212> PRT
<213> Centruroides noxius

<400> 234
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 235
<211> 129
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS
<222> (1) .. (129)
<223> Product= Erg-channel modifier toxin

<400> 235
gat aga gat agc tgt gtt gat aaa tca caa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gag tgt tgc aag aaa gct gga gaa cgt gta gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca 129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 236
<211> 43
<212> PRT
<213> Centruroides noxius

<400> 236

Asp Arg Asp Ser Cys Val Asp Lys Ser Gln Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Glu Arg Val Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 237
<211> 212
<212> DNA
<213> Centruroides noxius

<220>
<221> CDS
<222> (1) .. (132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3 'UTR
<222> (133) .. (212)
<223>

<400> 237 48
gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgc aag aat gct gga cac aat gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaaga ttattaaatt 202
tccgcaaatt 212

<210> 238
<211> 43
<212> PRT
<213> Centruroides noxius

<400> 238

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 239

<211> 129

<212> DNA

<213> Centruroides noxius

<220>

<221> CDS

<222> (1)..(129)

<223> Product= Erg-channel modifier toxin

<400> 239

gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgc aag aat gct gga cac aat gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca 129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 240

<211> 43

<212> PRT

<213> Centruroides noxius

<400> 240

Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Asn Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 241

<211> 194

<212> DNA

<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (130)..(194)
<223>

<400> 241
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt aca gat tgt tgc aag aaa tat gga cac aat ggg gga 96
Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
20 25 30

acc tgc atg ttt ttc aag tgt aaa tgt gcg taa actcgaagat aaattaataa 149
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

tatcaaagct gtaagctatt tatgaagtga aaaataaaga ttatg 194

<210> 242
<211> 42
<212> PRT
<213> Centruroides elegans

<400> 242
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 243
<211> 126
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(126)
<223> Product= Erg-channel modifier toxin

<400> 243
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt aca gat tgt tgc aag aaa tat gga cac aat ggg gga 96
 Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
 20 25 30

acc tgc atg ttt ttc aag tgt aaa tgt gcg 126
 Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
 35 40

<210> 244
<211> 42
<212> PRT
<213> Centruroides elegans

<400> 244

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
 1 5 10 15

Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
 20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
 35 40

<210> 245
<211> 197
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133)..(197)
<223>

<400> 245
 gat aga gat agc tgt gtt gat aaa tca aga tgc gca aaa tat gga tac 48
 Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
 1 5 10 15

tac caa cag tgt gaa att tgt tgc aag aaa gct gga cac aga gga gga 96
 Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
 20 25 30

acc tgc gaa ttt ttc aag tgt aaa tgt aaa gta taa actcgaatgt 142
 Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
 35 40

gaattaaagaa tatcaaagct gggactgtt tacgatgtga aaaataaaga ttatt 197

<210> 246
<211> 43

<212> PRT
<213> Centruroides elegans

<400> 246

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 247
<211> 129
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 247

gat aga gat agc tgt gtt gat aaa tca aga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa cag tgt gaa att tgt tgc aag aaa gct gga cac aga gga gga 96
Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

acc tgc gaa ttt ttc aag tgt aaa tgt aaa gta 129
Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 248
<211> 43
<212> PRT
<213> Centruroides elegans

<400> 248

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Gln Cys Glu Ile Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

Thr Cys Glu Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 249

<211> 196
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133)..(196)
<223>

<400> 249
gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tat cat caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

aac tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatgaaagat ggaagctgtt taagaagtga aaaataaaga ttat 196

<210> 250
<211> 43
<212> PRT
<213> Centruroides elegans

<400> 250
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 251
<211> 129
<212> DNA
<213> Centruroides elegans

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 251

gat aga gat agc tgt gtt gat aaa tca aaa tgc gga aaa tat gga tac Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr 1 5 10 15	48
tat cat caa tgt gat gag tgt tgc aag aaa gct gga gac cgt gca gga Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30	96
aac tgc gtg tat tac aag tgt aaa tgt aac cca Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro 35 40	129
 <210> 252 <211> 43 <212> PRT <213> Centruroides elegans	
 <400> 252	
Asp Arg Asp Ser Cys Val Asp Lys Ser Lys Cys Gly Lys Tyr Gly Tyr 1 5 10 15	
 Tyr His Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly 20 25 30	
 Asn Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro 35 40	
 <210> 253 <211> 193 <212> DNA <213> Centruroides gracilis	
 <220> <221> CDS <222> (1)..(129) <223> Product= Erg-channel modifier toxin precursor	
 <220> <221> 3'UTR <222> (130)..(193) <223>	
 <400> 253 gat aga gat agc tgt gtt gat aaa tca cga tgc gcg aaa tat gga cac Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly His 1 5 10 15	48
 tac caa gag tgt acg gat tgt tgc aag aaa tac gga cac aat gga gga Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly 20 25 30	96
 acc tgc atg ttc ttc aag tgt aaa tgt gcg taa actcgaagat gaattaataa Thr Cys Met Phe Phe Lys Cys Lys Cys Ala 35 40	149
 tataaaaagct gtaagctatt tacgaagtga aaaaataaaaga ttat	193

<210> 254
<211> 42
<212> PRT
<213> Centruroides gracilis

<400> 254

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly His
1 5 10 15

Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 255
<211> 126
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1)..(126)
<223> Product= Erg-channel modifier toxin

<400> 255

gat aga gat agc tgt gtt gat aaa tca cga tgc gcg aaa tat gga cac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly His
1 5 10 15

tac caa gag tgt acg gat tgt tgc aag aaa tac gga cac aat gga gga 96
Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
20 25 30

acc tgc atg ttc ttc aag tgt aaa tgt gcg 126
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 256
<211> 42
<212> PRT
<213> Centruroides gracilis

<400> 256

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly His
1 5 10 15

Tyr Gln Glu Cys Thr Asp Cys Cys Lys Lys Tyr Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 257
<211> 193
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (130)..(193)
<223>

<400> 257
gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga aac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
1 5 10 15

tac gct cag tgt acg gcc tgt tgc aag aag gct gga cac aat aaa gga 96
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Ala Gly His Asn Lys Gly
20 25 30

acc tgc gac ttt ttc aag tgt aaa tgt acg taa tctcgaagaa gaattaatta 149
Thr Cys Asp Phe Lys Cys Lys Cys Thr
35 40

tatcaaagct tggaaccaat taccgaagtg gaaaaattaa gaat 193

<210> 258
<211> 42
<212> PRT
<213> Centruroides gracilis

<400> 258
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
1 5 10 15

Tyr Ala Gln Cys Thr Ala Cys Cys Lys Ala Gly His Asn Lys Gly
20 25 30

Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
35 40

<210> 259
<211> 126
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1)..(126)
<223> Product= Erg-channel modifier toxin

<400> 259
gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga aac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn
1 5 10 15

tac gct cag tgt acg gcc tgt tgc aag aag gct gga cac aat aaa gga 96
Tyr Ala Gln Cys Thr Ala Cys Cys Lys Lys Ala Gly His Asn Lys Gly
20 25 30

acc tgc gac ttt ttc aag tgt aaa tgt acg 126
Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
35 40

<210> 260
<211> 42
<212> PRT
<213> Centruroides gracilis

<400> 260
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Asn 1 5 10 15

Tyr Ala Gln Cys Thr Ala Cys Cys Lys Lys Ala Gly His Asn Lys Gly 20 25 30

Thr Cys Asp Phe Phe Lys Cys Lys Cys Thr
35 40

<210> 261
<211> 197
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1) .. (141)
<223> Product= Erg-channel modifier toxin precursor
In the mature peptide, the last Ser is amidated, and the last Gly
and the last basic aminoacid are cut

<220>
<221> 3'UTR
<222> (142) .. (197)
<223>

<400> 261
gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga ccc 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
1 5 10 15

tac gga cag tgt acg gac tgt tgc aag aaa gct gga cac act gga gga 96
Tyr Gly Gln Cys Thr Asp Cys Cys Lys Lys Ala Gly His Thr Gly Gly
20 25 30

acc tgc ata tat ttc aag tgt aaa tgt ggc gca gaa agt gga aga 141
Thr Cys Ile Tyr Phe Lys Cys Lys Cys Gly Ala Glu Ser Gly Arg

35 40 45

tgaatttata atatcaaagc tgtaagctat ttacgaagtg aaaaataaag attatt 197

<210> 262
<211> 47
<212> PRT
<213> Centruroides gracilis

<400> 262

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
1 5 10 15

Tyr Gly Gln Cys Thr Asp Cys Cys Lys Lys Ala Gly His Thr Gly Gly
20 25 30

Thr Cys Ile Tyr Phe Lys Cys Lys Cys Gly Ala Glu Ser Gly Arg
35 40 45

<210> 263
<211> 135
<212> DNA
<213> Centruroides gracilis

<220>
<221> CDS
<222> (1)..(135)
<223> Product= Erg channel modifier toxin

<400> 263

gat aga gat agc tgt gtt gat aaa tca cga tgc caa aaa tat gga ccc 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
1 5 10 15

tac gga cag tgt acg gac tgt tgc aag aaa gct gga cac act gga gga 96
Tyr Gly Gln Cys Thr Asp Cys Cys Lys Lys Ala Gly His Thr Gly Gly
20 25 30

acc tgc ata tat ttc aag tgt aaa tgt ggc gca gaa agt
Thr Cys Ile Tyr Phe Lys Cys Lys Cys Gly Ala Glu Ser 135
35 40 45

<210> 264
<211> 45
<212> PRT
<213> Centruroides gracilis

<400> 264

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gln Lys Tyr Gly Pro
1 5 10 15

Tyr Gly Gln Cys Thr Asp Cys Cys Lys Lys Ala Gly His Thr Gly Gly
20 25 30

Thr Cys Ile Tyr Phe Lys Cys Lys Cys Gly Ala Glu Ser
35 40 45

<210> 265
<211> 194
<212> DNA
<213> Centruroides sculpturatus

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (130)..(194)
<223>

<400> 265
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgc aag aaa gct gga cat aat gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

acc tgt atg ttt ttc aag tgt aaa tgt gcg taa actcgaagat gaattaataa 149
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

tatcaaagct gtaagctatt tatgaagtga aaaataaaaga ttatt 194

<210> 266
<211> 42
<212> PRT
<213> Centruroides sculpturatus

<400> 266

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 267
<211> 126
<212> DNA
<213> Centruroides sculpturatus

<220>

<221> CDS
<222> (1)..(126)
<223> Product= Erg-channel modifier toxin

<400> 267
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac caa gag tgt cag gat tgt tgc aag aaa gct gga cat aat gga gga 96
Tyr Gln Glu Cys Gln Asp Cys Cys Lys Ala Gly His Asn Gly Gly
20 25 30

acc tgt atg ttt ttc aag tgt aaa tgt gcg 126
Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 268
<211> 42
<212> PRT
<213> Centruroides sculpturatus

<400> 268
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gln Glu Cys Gln Asp Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Lys Cys Ala
35 40

<210> 269
<211> 197
<212> DNA
<213> Centruroides sculpturatus

<220>
<221> CDS
<222> (1)..(132)
<223> precursorProduct= Erg-channel modifier toxin

<220>
<221> 3'UTR
<222> (133)..(197)
<223>

<400> 269
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gaa gtt tgt aag aaa gct gga cat aga gga gga 96
Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

acc tgc gat ttt ttc aag tgt aaa tgt aaa gta taa actcgaatgt 142
Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
35 40

gaatttaagaa tatcaaagct gggaaactgtt tacgaagtga aaaataaaga ttttg 197

<210> 270
<211> 43
<212> PRT
<213> *Centruroides sculpturatus*

<400> 270

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 271
<211> 129
<212> DNA
<213> *Centruroides sculpturatus*

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 271
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gaa gtt tgt aag aaa gct gga cat aga gga gga 96
Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

acc tgc gat ttt ttc aag tgt aaa tgt aaa gta 129
Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 272
<211> 43
<212> PRT
<213> *Centruroides sculpturatus*

<400> 272

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Arg Gly Gly
20 25 30

Thr Cys Asp Phe Phe Lys Cys Lys Cys Lys Val
35 40

<210> 273
<211> 197
<212> DNA
<213> Centruroides sculpturatus

<220>
<221> CDS
<222> (1)..(132)
<223> Product= Erg-channel modifier toxin precursor

<220>
<221> 3'UTR
<222> (133)..(197)
<223>

<400> 273
gat aga gat agc tgt gtt gat aaa tca cga tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gac tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga ttatt 197

<210> 274
<211> 43
<212> PRT
<213> Centruroides sculpturatus

<400> 274

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 275
<211> 129
<212> DNA

<213> Centruroides sculpturatus

<220>

<221> CDS

<222> (1)..(129)

<223> Product= Erg-channel modifier toxin

<400> 275

gat aga gat agc tgt gtt gat aaa tca cga tgc gga aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

48

tac ggt caa tgt gat gac tgt tgc aag aaa gct gga gac cgt gca gga
Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

96

acc tgc gtg tat tac aag tgt aaa tgt aac cca
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

129

<210> 276

<211> 43

<212> PRT

<213> Centruroides sculpturatus

<400> 276

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Asp Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 277

<211> 195

<212> DNA

<213> Centruroides sculpturatus

<220>

<221> CDS

<222> (1)..(132)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (133)..(195)

<223>

<400> 277

gat aga gat agc tgt gtt gat aaa tca cga tgc gga aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

48

tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca taa actcgaatgt 142
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

gaattaaagaa tatcaaagct ggaagctgtt taagaagtga aaaataaaga tta 195

<210> 278
<211> 43
<212> PRT
<213> Centruroides sculpturatus

<400> 278

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 279
<211> 129
<212> DNA
<213> Centruroides sculpturatus

<220>
<221> CDS
<222> (1)..(129)
<223> Product= Erg-channel modifier toxin

<400> 279

gat aga gat agc tgt gtt gat aaa tca cga tgc gga aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gat gaa tgt tgc aag aaa gct gga gac cgt gca gga 96
Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

acc tgc gtg tat tac aag tgt aaa tgt aac cca 129
Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 280
<211> 43
<212> PRT
<213> Centruroides sculpturatus

<400> 280

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Gly Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Asp Glu Cys Cys Lys Lys Ala Gly Asp Arg Ala Gly
20 25 30

Thr Cys Val Tyr Tyr Lys Cys Lys Cys Asn Pro
35 40

<210> 281

<211> 192

<212> DNA

<213> Centruroides sculpturatus

<220>

<221> CDS

<222> (1)..(144)

<223> Product= Erg-channel modifier toxin precursor

<220>

<221> 3'UTR

<222> (145)..(192)

<223>

<400> 281

gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

48

tac ggt caa tgt gaa gtt tgt tgt aag aaa gct gga cat aat gga gga
Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

96

acc tgt atg ttt ttc aag tgt atg tgc gta aac tcg aag atg aat taa
Thr Cys Met Phe Phe Lys Cys Met Cys Val Asn Ser Lys Met Asn
35 40 45

144

taatatcaaa gctgtaagct atttatgaag tgaaaaataa agattatt

192

<210> 282

<211> 47

<212> PRT

<213> Centruroides sculpturatus

<400> 282

Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Met Cys Val Asn Ser Lys Met Asn
35 40 45

<210> 283
<211> 141
<212> DNA
<213> *Centruroides sculpturatus*

<220>
<221> CDS
<222> (1)..(141)
<223> Product= Erg-channel modifier toxin

<400> 283
gat aga gat agc tgt gtt gat aaa tca cga tgc gca aaa tat gga tac 48
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

tac ggt caa tgt gaa gtt tgt tgt aag aaa gct gga cat aat gga gga 96
Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

acc tgt atg ttt ttc aag tgt atg tgc gta aac tcg aag atg aat 141
Thr Cys Met Phe Phe Lys Cys Met Cys Val Asn Ser Lys Met Asn
35 40 45

<210> 284
<211> 47
<212> PRT
<213> *Centruroides sculpturatus*

<400> 284
Asp Arg Asp Ser Cys Val Asp Lys Ser Arg Cys Ala Lys Tyr Gly Tyr
1 5 10 15

Tyr Gly Gln Cys Glu Val Cys Cys Lys Lys Ala Gly His Asn Gly Gly
20 25 30

Thr Cys Met Phe Phe Lys Cys Met Cys Val Asn Ser Lys Met Asn
35 40 45

<210> 285
<211> 24
<212> DNA
<213> Artificial

<220>
<223> PCR Reverse oligonucleotide primer

<220>
<221> misc_feature
<222> (23)..(23)
<223> n is a, t, g, or c

<220>
<221> primer_bind
<222> (1)..(24)
<223> oligonucleotide T22NN

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<220>
<221> misc_feature
<222> (24)..(24)
<223> n is a, t, g, or c

<400> 285
ttttttttt tttttttttt ttnn                                24

<210> 286
<211> 25
<212> DNA
<213> Artificial

<220>
<223> PCR Direct oligonucleotide primer

<220>
<221> misc_feature
<222> (24)..(24)
<223> y is c or t

<220>
<221> primer_bind
<222> (1)..(25)
<223> Oligonucleotide D1

<400> 286
gagatgaatt cgttgttcat gatya                                25

<210> 287
<211> 22
<212> DNA
<213> Artificial

<220>
<223> PCR Reverse oligonucleotide primer

<400> 287
gcaattaaga agcgttacaa ta                                22

<210> 288
<211> 16
<212> DNA
<213> Artificial

<220>
<223> PCR Direct oligonucleotide primer

<220>
<221> misc_feature
<222> (2)..(2)
<223> m is a or c

<220>
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<221> primer_bind
<222> (1)..(16)
<223> Direct oligonucleotide CexD2
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<220>
<221> misc_feature
<222> (5)..(5)
<223> r is a or g
```

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<220>
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<222> (9)..(9)
<223> r is a or g
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```
<400> 288
gmaarggarg gttatc
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16

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<210> 289
<211> 16
<212> DNA
<213> Artificial

<220>
<223> PCR Direct oligonucleotide primer
```

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<220>
<221> misc_feature
<222> (1)..(1)
<223> r is a or g
```

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<220>
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<223> Direct oligonucleotide CexD3
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<220>
<221> misc_feature
<222> (16)..(16)
<223> b is c or g
```

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<220>
<221> misc_feature
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```

```
<400> 289
raaggasgt tatccb
```

16

```
<210> 290
<211> 17
<212> DNA
<213> Artificial
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<220>
<223> PCR Reverse oligonucleotide primer

<220>
<221> primer_bind
<222> (1)..(17)
<223> Reverse Oligonucleotide ErgR1

<220>
<221> misc_feature
<222> (2)..(2)
<223> m is a or c

<220>
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<222> (1)..(1)
<223> m is a or c

<400> 290
mmtaatcttt attttgc

17

<210> 291
<211> 17
<212> DNA
<213> Artificial

<220>
<223> PCR Reverse oligonucleotide primer

<220>
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<223> Reverse Oligonucleotide ErgR2

<220>
<221> misc_feature
<222> (16)..(16)
<223> m is a or c

<220>
<221> misc_feature
<222> (17)..(17)
<223> m is a or c

<400> 291
aatttgcgga aatttmm

17

<210> 292
<211> 27
<212> DNA
<213> Artificial

<220>
<223> PCR Direct oligonucleotide primer

<220>
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<222> (1)..(27)
<223> Direct oligonucleotide ErgD1

<400> 292
gatagagata gctgtgttga taaatca

27

<210> 293
<211> 24
<212> DNA
<213> Artificial

<220>
<223> PCR Direct oligonucleotide primer

<220>
<221> primer_bind
<222> (1)..(24)
<223> Oligonucleotide

<220>
<221> primer_bind
<222> (1)..(24)
<223> Direct oligonucleotide

<400> 293
atgaaagaag gttatctggtaaac

24

<210> 294
<211> 24
<212> DNA
<213> Artificial

<220>
<223> PCR Reverse oligonucleotide primer

<220>
<221> primer_bind
<222> (1)..(24)
<223> Reverse oligonucleotide

<400> 294
tttagctgcaa gatttatttag gaag

24